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MUSEUMS ASSOCIATION.

CANTERBURY MEETING.

1900.

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MUSEUMS ASSOCIATION.

REPORT OF PROCEEDINGS

WITH THE PAPERS READ AT THE

ELEVENTH ANNUAL GENERAL MEETING,

HELD IN CANTERBURY—JULY 9 TO 12, 1900.

PRESIDENT:

HENRY WOODWARD, LL.D., F.R.S.,

British Museum (Natural History).

EDITED BY

E. HOWARTH, F.R.A.S., F.Z.S.,

Public Museum and Mappin Art Gallery, Sheffield.

LONDON:

DULAU AND CO.

1900.

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ANNUAL MEETINGS OF THE ASSOCIATION.

Year.	Place.	President.
1889.	Inaugural Meeting at York.	
1890.	Liverpool	Rev. H. H. Higgins, M.A.
1891.	Cambridge	J. Willis Clark, M.A.
1892.	Manchester	Prof. Boyd Dawkins, M.A., F.R.S.
1893.	London	Sir William H. Flower, K.C.B., D.C.L., F.R.S.
1894.	Dublin	Valentine Ball, C.B., LL.D., F.R.S.
1895.	Newcastle-upon-Tyne	Rev. Canon Norman, M.A., D.C.L., F.R.S.
1896.	Glasgow	James Paton, F.L.S.
1897.	Oxford	E. Ray Lankester, M.A., LL.D., F.R.S.
1898.	Sheffield	Ald. W. H. Brittain, J.P., F.R.G.S.
1899.	Brighton	Ald. A. J. Hawkes.
1900.	Canterbury	Henry Woodward, LL.D., F.R.S.

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INTRODUCTION.

CANTERBURY, which the Mayor so aptly termed in his welcoming address to the Association a museum itself, was in every respect a most fitting place for the Annual Conference of the Museums Association, and the satisfaction derived from the visit seemed to be as fully shared by the people of Canterbury as it was by the members of the Association. The arrangements made by the Local Committee met all requirements in a most convenient and exhaustive manner, while the hospitality, mingled with sincere warmth of feeling, on every side accorded, made the Canterbury Conference one of the pleasantest that the Association has experienced.

The importance and value of the work done was quite equal to that of any previous year, as will be seen from the published Proceedings which follow. Steady growth continues to mark the history of the Association, which now embraces nearly all the principal museums in the kingdom, as well as a fair number of representatives of colonial and foreign museums. Each year sees new additions to the membership, although no special effort has hitherto been made to induce museums to join, the obvious advantages of such an Association for the development and improvement of museums being sufficient to attract to it all who have a sincere desire to help on the museum movement.

With surplus funds accumulating at an increased rate each year, there is an incentive to the Association to still further extend its work and influence. The most natural method which suggests itself is the production of a monthly Journal

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devoted entirely to museum interests. Such a Journal could be made a means of great usefulness to museum authorities, and there can be little doubt that, if started, it would meet with warm support. The Council have already gathered information as to the cost of such a Journal, which has been embodied in the report now published in this volume. They have cautiously, however, refrained from recommending any action at present until every chance of financial risk is completely guarded against; and also, what is perhaps more difficult and certainly equally important, to make arrangements for the proper editing and circulation of a Journal. In the meantime an effort will be made before the next Conference to consolidate the Association, to increase the membership. and augment the reliable and definite income.

Another matter recommended is the publication of a Museums Directory, which shall indicate the special features of a museum as well as general facts of its administration. It is many years since any official list of museums was published, and if now brought up to date it would form a very useful work of reference to all curators.

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LIST OF MUSEUMS AND ASSOCIATES

BELONGING TO THE ASSOCIATION, WITH THE NAMES OF THE REPRESENTATIVES PRESENT AT THE CANTERBURY MEETING.

Names of Curators in italics.

MUSEUMS.

Australian Museum (Sydney)	
Baroda State Museum	
Blackburn	
Bolton	Ald. J. T. Brooks, Counc. R. Fairclough, *W. W. Midgley, F.R.M.S.*
Bootle	*Charles H. Hunt.*
Bradford	
Brighton	
Bristol	
Canterbury	The Mayor of Canterbury, Ald. W. W. Mason, Ald. Hart, Henry Mead.
Cape Town, South African Museum,	
Cardiff	
Carnegie Museum, Schenley Park, Pittsburg, Pa.	
Chester	
Colombo	
Dundee	
Glasgow	*Jas. Paton, F.L.S.*
Hereford	
Jamaica, Institute of	
Library Association	Samuel Smith.
Liverpool	*H. O. Forbes, LL.D.*
London, Horniman Museum	*R. Quick, M.J.S.*
,, Parkes' Museum of the Sanitary Institute	
,, Peeks Museum	
,, Pharmaceutical Society	*E. M. Holmes, F.L.S.*
Manchester (Owens College)	*W. E. Hoyle, M.A.*
,, Queen's Park	
Maidstone	*F. V. James, F.S.A.*
Middlesborough	
Newcastle-upon-Tyne	
Northampton	
Nottingham	W. Bradshaw, *Prof. J. W. Carr, M.A.*

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Norwich	
Perth	
Perth, Western Australia	
St. Helens	*Alfred Lancaster.*
Saffron Walden	
Salford	Ald. F. S. Phillips, J.P., *Ben. H. Mullen, M.A. (Dub.).*
Salt Lake City, Utah, Deseret Museum	
Sheffield, Public Museum	Ald. W. H. Brittain, J.P., F.R.G.S., Counc. G. Jackson Smith, Dr. J. A. Manton, *E. Howarth, F.R.A.S., F.Z.S.*
,, Ruskin Museum	*Gill Parker.*
Stockport	
Sunderland	*Jas. M. E. Bowley.*
Warrington	*Charles Madeley.*
Winchester College	
Worcester	*W. H. Edwards.*
York	*H. M. Platnauer B.Sc.*

ASSOCIATES.

Those printed in italics were present at the Meeting.

Anderson, Prof. W. C. F., M.A., University College, Sheffield.

Balfour, Henry, M.A., Pitt-Rivers Museum, Oxford.
Bather, F. A., M.A., British Museum (Nat. Hist.), London.
Brunchorst, Dr. J., Bergen Museum, Norway.
Buddicom, Robert A., B.A., F.G.S., Museum, Plymouth.
Bullen, Rev. R. Ashington, B.A., F.G.S., Horsley, Surrey.

Carpenter, G. H., M.A., Museum of Science and Art, Dublin.
Cheeseman, J. F., Auckland Museum, New Zealand.
Crake, William V., B.A., Museum, Hastings.

Dawes, Dr. G. H., Sheffield.
Denny, Prof. Alfred, F.L.S., University College, Sheffield.
Donner, E., Manchester.
Donner, Mrs. E., Manchester.
Dorsey, Dr. George A., Field Columbian Museum, Chicago.

Goldney, Frank Bennett, Dover.
Gould, I. Chalkley, Loughton, Essex.
Greening, Linnæus, Warrington.

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Hall, Miss Kate M., Museum, Whitechapel, London.
Henshaw, Samuel, Boston Soc. Nat. Hist., Mass., U.S.A.
Hughes, Prof. T. M'Kenny, F.R.S., Woodwardian Museum, Cambridge.
Hutchinson, Jonathan, LL.D., M.D., F.R.S., London.
Hutton, Capt. F. W., Canterbury Museum, Christchurch, New Zealand.

Irving, John, London.

Jackson, Dr. Robert T., Harvard University, Cambridge, Mass., U.S.A.
Jennings, A. Vaughan, F.L.S., F.G.S., Royal College of Science, Dublin.

Longfield, T. H., F.S.A., Museum of Science and Art, Dublin.
Lucas, F. A., Department of Comparative Anatomy, U.S. National Museum.

Manton, Dr. J. A., Sheffield.
Mason, Thomas, Free Library, St. Martins, London, W.C.
Martin, R. F., Victoria and Albert Museum, London.
Martin, Mrs. R. F., London.
Meyer, A. B., M.D., Museum, Dresden.
Monks, F. W., Warrington.
Morgan, John, St. Leonards-on-Sea.

Newton, E. T., F.R.S., Geological Survey, London, W.

Pacy, Frank, Library Association.
Parkin, William, Sheffield.
Petrie, Prof. Wm. Flinders, M.A., D.C.L., University College, London.
Phipson, Miss Emma, Reigate.

Reeve, James, Castle Museum, Norwich.
Rudler, F. W., F.G.S., Museum of Practical Geology, London.

Scharff, Dr. R. F., Museum of Science and Art, Dublin.
Sclater, P. L., LL.D., F.R.S., Zoological Society, London.
Smith, Harlan I., American Museum of Natural History.
Stokes, John, M.D., Sheffield.
Sorby, H. C., LL.D., F.R.S., Sheffield.

Trail, Prof., University Library, Aberdeen.
Tuppenney, Alderman F., J.P., Mayor of Hastings.

Veitch, W. Y., Museum, Middlesborough.

Webster, W. D., Bicester, Oxon.
White, Thomas, London.
Woodward, A. Smith, British Museum (Nat. Hist.), London.
Woodward, Dr. Henry, F.R.S., British Museum (Nat. Hist.), London.
Woodward, Mrs. Henry, London.
Woolnough, Frank, Museum, Ipswich.

Yates, George C., F.S.A., Swinton, Manchester.

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COUNCIL, 1900-1901.

President:

HENRY WOODWARD, LL.D., F.R.S. (British Museum).

President-Elect:

Sir WILLIAM TURNER, D.Sc., D.C.L., LL.D., F.R.S.

Past Presidents:

Alderman W. H. BRITTAIN, J.P., F.R.G.S.
J. WILLIS CLARK, M.A.
Prof. W. BOYD DAWKINS, M.A., F.R.S.
The Rev. Canon NORMAN, M.A., D.C.L., F.R.S.
Prof. E. RAY LANKESTER, LL.D., F.R.S.
JAMES PATON, F.L.S.
Alderman A. J. HAWKES.

Vice-Presidents:

The Worshipful the MAYOR OF CANTERBURY (Alderman GEORGE COLLARD, J.P.).
The Worshipful the MAYOR OF DOVER (Sir WILLIAM CRUNDALL, J.P.).
The Right Rev. the BISHOP OF DOVER.
The Very Rev. the DEAN OF CANTERBURY.
The Rev. Canon ROUTLEDGE, M.A., F.S.A.
Alderman MASON, J.P.
F. BENNETT-GOLDNEY (Hon. Curator, the Royal Museum, Canterbury).

Ordinary Members of Council:

1897— E. M. HOLMES, F.L.S. (London).
1898— JAS. M. E. BOWLEY (Sunderland).
*W. E. HOYLE, M.A. (Owens College).
JOHN MACLAUCHLAN (Dundee).
JOHN STOKES, M.D. (Sheffield).
1899— F. BENNETT-GOLDNEY (Canterbury).
B. LOMAX, F.L.S. (Brighton).
*H. M. PLATNAUER, B.Sc. (York).
1900—*Prof. J. W. CARR (Nottingham).
BEN. H. MULLEN, M.A. (Salford).
W. H. EDWARDS (Worcester).
R. F. MARTIN (London).

* Members of Executive Committee.

Treasurer:

Alderman W. H. BRITTAIN, J.P., F.R.G.S. (Museum, Sheffield).

General Secretary and Editor:

E. HOWARTH, F.R.A.S., F.Z.S. (Museum, Sheffield).

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LOCAL COMMITTEE.

The Worshipful the MAYOR OF CANTERBURY
(Alderman GEORGE COLLARD, J.P.).
F. BENNETT-GOLDNEY, Esq.
(Hon. Curator, the Royal Museum, Canterbury).
ALFRED D. BLAXLAND, Esq.
The Rev. R. J. E. BOGGIS, M.A.
(Sub-Warden of St. Augustine's College, Canterbury).
JOSHUA COX, Esq.
SEBASTIAN EVANS, Esq., M.A., LL.D.
HENRY FIELDING, Esq. (Town Clerk).
Rev. A. J. GALPIN, M.A.
F. T. GENTRY, Esq.
STEPHEN HORSLEY, Esq.
Colonel KNOCKER, C.B.
The Rev. Canon MACLEAR, D.D.
(Warden of St. Augustine's College, Canterbury).
The Rev. Canon MASON, D.D.
Alderman MASON, J.P. (Deputy Mayor).
WILLIAM H. NETHERCLIFT, Esq., F.R.C.S.
J. OGDEN, Esq.
W. J. RUSSELL, Esq.
Alderman SANDERSON.
J. F. WHICHCORD, Esq.

Local Secretary:

HENRY MEAD (Royal Museum, Canterbury).

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ORDER OF PROCEEDINGS.

1900.

MONDAY, 9TH JULY.

2 to 6 p.m.	Reception Room open in Royal Museum.
5 p.m.	Meeting of Executive Committee in Royal Museum.
8 p.m.	Meeting of Council in Royal Museum.

TUESDAY, 10TH JULY.

10 a.m. to 1 p.m.	Welcome by the MAYOR OF CANTERBURY. Address by the PRESIDENT—Dr. H. WOODWARD. Reading and discussion of the following Papers:— "Canterbury and the Royal Museum," by F. BENNETT-GOLDNEY. "Hastings Museum, Victoria Institute, Worcester," by W. H. EDWARDS. "The Horniman Museum," by RICHARD QUICK, M.J.S. "A Rambling Dissertation on Museums by a Museum Rambler," by Dr. J. A. MANTON. "The Norwich Castle Museum," by Dr. HENRY WOODWARD, F.R.S.
1 to 2 p.m.	Luncheon in the Royal Fountain Hotel, by invitation of Mr. F. BENNETT-GOLDNEY.

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TUESDAY, 10TH JULY—*continued.*

3.45 to 4.45 p.m.	Inspected the Cathedral under the guidance of the Very Reverend the DEAN, who kindly invited the Association to Tea at the Deanery.
8.30 p.m.	Conversazione, on the invitation of the MAYOR and MAYORESS, at the Royal Museum and Beaney Institute.

WEDNESDAY, 11TH JULY.

10 a.m. to 1 p.m.	Reading and discussion of the following Papers:— "A National Repository of Science and Art," by Prof. W. M. FLINDERS PETRIE, D.C.L. "Exhibition Labels for Blastoidea," by F. A. BATHER, M.A. "The Reproduction of Art Objects," by ROBERT F. MARTIN. "How to Develop Delicate Organisms from the Chalk and Exhibit them in Museums," by Dr. ARTHUR W. ROWE, F.G.S. "Photography in Museum Work," by Prof. J. W. CARR, M.A., F.L.S., F.G.S.
1 to 2 p.m.	Luncheon in the County Hotel.
2 to 5 p.m.	A general inspection of the City of Canterbury (including the St. Augustine's Museum, where the Sub-Warden gave a short address) and the Royal Museum, under the guidance of Mr. F. BENNETT-GOLDNEY.
7.30 p.m.	Association Dinner in the County Hotel.

THURSDAY, 12TH JULY.

10 a.m. to 1 p.m.	Business Meeting: Treasurer's Report. Report of Council on proposed Journal.

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THURSDAY, 12TH JULY—*continued.*

	Report of Committee on Museums Directory.
	Election of Council and Officers.
	Reading and discussion of the following Papers:—
	"A Substitute for Card for Setting Coleoptera, &c.," by THOMAS MIDGLEY, F.R.M.S.
	"Finances of Rate-supported Museums and Art Galleries," by BEN. H. MULLEN, M.A.
1 to 2 p.m.	Luncheon in the County Hotel.
2.26 p.m.	Visit to Dover, where the Castle was inspected by permission of the General Commanding the S.E. District. Afterwards there was a Reception by the MAYOR OF DOVER, and the Museum was visited.

The meetings were held in the Royal Museum.

A Series of British Museum Publications were exhibited by the PRESIDENT.

A Series of Photographs suitable for Museum exhibition were shown by the PRESIDENT.

Model of Shell of extinct Cephalopod (*Ascoceras*) was exhibited by G. C. CRICK, F.G.S.

Fifteen coloured casts of Figured Fossils from the British Museum were exhibited by the PRESIDENT.

Charts of distribution of Fossil Mammalia, designed by Dr. Forsyth-Major, F.Z.S., were exhibited by the PRESIDENT.

Fittings for Museums and Museum Cases were exhibited by Prof. W. M. FLINDERS PETRIE, D.C.L.

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MUSEUM ASSOCIATION RULES,

AS AMENDED AND ADOPTED AT THE BRIGHTON MEETING, 1899.

1.—That this Association be called the "MUSEUMS ASSOCIATION," and shall consist of representatives of Museums, of other persons engaged in scientific work or interested in Museums, who may be admitted as Associates, and of Honorary Members. The number of Honorary Members shall not exceed fifteen; they shall be distinguished either for success in Museum work, or for services to the Association; they shall be nominated by the Council, and elected by the Association.

2.—The object of the Association shall be the promotion of better and more systematic working of Museums throughout the Kingdom. In order to promote a better knowledge of Museums, the Association shall meet in a different town each succeeding year.

3.—That each Museum contributing not less than one guinea a year be a Member of the Association, and that individuals interested in scientific work be admitted as Associates on payment of 10s. 6d. annually.

4.—That each Museum be represented by three delegates, each having one vote. Each Associate to have one vote.

5.—That each Museum belonging to the Association and each Associate receive one copy of the publications of the Association.

6.—That the affairs of the Association be managed by a Council consisting of a President, Vice-Presidents, two Secretaries, or a Secretary and an Editor, a Treasurer, and twelve ordinary Members; three to constitute a quorum; all past Presidents to be *ex-officio* Members of Council. The President, Vice-Presidents, and four ordinary Members of Council to retire each year, and to be ineligible for re-election for one year.

7.—The Council to be elected at the Annual General Meeting, and to hold office for one year. The Council shall have power to fill any vacancies that may occur in its ranks between Annual Meetings. At each Annual Meeting the Council shall, as soon as possible, post in a conspicuous place in the Reception Room a list of the names of those persons nominated by it to fill vacancies in the Council and Officers.

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8.—That a General Meeting of the Association be held annually, for the transaction of business, the reading of papers, and the discussion of matters relating to Museums.

9.—The place and time of the Annual Meeting to be determined by the Council.

10.—That an Executive Committee, consisting of the President, Secretaries (or Secretary and Editor), Treasurer, and two other members of the Council, shall each year be appointed by the Council to deal with any matters that may arise between the Annual Meetings; and that the railway fares of members of the Executive Committee attending meetings be paid out of the funds of the Association—the meetings to be called on the responsibility of the President and Secretaries.

11.—All new rules, and all resolutions affecting existing ones, to be submitted to the Annual General Meeting. One calendar month's notice to be given of all resolutions affecting the rules.

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MUSEUMS ASSOCIATION.

STATEMENT OF INCOME AND EXPENDITURE FOR THE YEAR ENDING JUNE, 1900.

RECEIPTS.

Balance from previous Year,		£84	11 9
Members' Subscriptions, 1898,		7	7 0
Do. do., 1899,		35	14 0
Associates' do., 1898,		5	5 0
Do. do., 1899,		19	8 6
Advertisements, 1898,		4	6 9
Sale of Reports,		3	11 3
Bank Interest,		1	17 1
		£162	1 4
Balance brought forward,		£87	14 6
Members' Subscriptions, 1900,		11	11 0
Associates' do., 1900,		8	8 0
Cash in Bank,		£107	13 6
Subscriptions in Arrear—			
Associates—1897, £1 11s. 6d.; 1898, £1 11s. 6d.; 1899, £4 4s.,		£7	7 0
Members—1898, £1 1s.; 1899, £5 5s.,		6	6 0
		£13	13 0

EXPENDITURE.

Printing,		£2	13 2
Reports,		46	9 8
Fares of Executive Committee,		5	2 4
Disbursements,		19	19 5
Commission (Bankers),		0	2 3
		£74	6 10
Balance,		87	14 6
		£162	1 4

W. H. BRITTAIN, *Treasurer.*

Examined—*11th July*, 1900.

C. MADELEY,
H. M. PLATNAUER, } *Auditors.*

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GENERAL PROCEEDINGS.

10th July, 1900.

The MAYOR OF CANTERBURY (Alderman George Collard) first addressed the conference in the following terms :—

Mr. President, Ladies, and Gentlemen,—In offering a friendly greeting to the Museums Association, it is a pleasure to know and to say that I am supported by the unanimous feeling of the citizens of Canterbury.

It was a happy thought which led to the formation of your Association eleven years ago—a thought which has already borne much excellent fruit, and is destined, we all hope and believe, to produce a yet more striking and beneficial result in years to come.

The field of your labours is practically infinite; you collect and record, you classify and arrange, you preserve and display to the best advantage, all that is pure, or valuable, or instructive, in the domain alike of art and nature. We humble outsiders are simply bewildered by the variety and magnificence of your achievements.

Nothing comes amiss to you. Yesterday you catalogued the wondrous products of the "Challenger" expedition, and, by way of interlude, exhibited to us the skin of the last giant sloth, from the caverns of Patagonia. To-day we are told that you have unearthed the mummy of the first of the Pharaohs, and have recovered more than one unknown alphabet from the labyrinth of Crete.

Now, it has been well said that the well-educated man knows something about everything and everything about something.

The field of knowledge which you collectively cover necessarily lies far beyond the ken of any individual intellect. We unscientific people regard with admiration, almost with awe, the learning and attainments of you specialists of the museums; but

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you yourselves will be the first to admit that the most gifted of curators can at best be past master in a few only of the numberless departments of science. And here it is that the work in which your Association is engaged specially recommends itself to those whose duty it is to see that our municipal institutions are in efficient working order.

The usefulness of all museums to the public depends in a great measure on the skill and knowledge with which they are arranged, and the accuracy of the information they convey. All our local museums have to contend with considerable difficulties, provincial appliances, limited space, and very strictly limited funds. But if things could be so managed that in all our provincial museums each special department should be arranged by the very man in England who knows most about that special department, we should, I fancy, get gradually as near perfection in the way of museum arrangements as is practically possible in this somewhat imperfect world.

Is such a consummation too good to be true? I hope not; I believe not. At all events, in those cities which year after year you honour by your presence, it ought to be not only possible, but easily possible. You have but to lay your learned specialists' heads together to give and accept hints and suggestions in that spirit of mutual helpfulness and co-operation which your Association has already done so much to foster, and the thing is done.

Here, at least, I can assure you of our readiness to learn and our gratitude for assistance, and I cannot doubt that your Association, which has already done so much good work in the past, will, before many years are over, reap its due reward in a marked and general improvement in the character and utility of our provincial museums throughout the country.

You will, I trust, pardon me the length of my remarks. As one of the official curators of a city *which is in itself a museum* I may perhaps claim to be regarded as, in a certain sense, one of yourselves. One privilege at least is conferred upon me by my office which it is a sincere pleasure to exercise. In the name of the mother city of the English empire I can offer to the members of the Museums Association a hearty and fraternal welcome, and

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can assure you in all truth that we are pleased to see you amongst us.

On the motion of Mr. W. E. HOYLE, seconded by Mr. J. PATON, a hearty vote of thanks was given to the Mayor for his address.

Alderman BRITTAIN said that, in the absence of the outgoing President, it devolved upon him to take part in the proceedings that day. They had met in many centres, many towns, and many cities, and they had even the courage two years ago to go to Sheffield, in spite of its reputation. Now they came, as the Mayor said, to the mother city of this great empire—the most venerable and the most interesting of English cities—and they had received from the Mayor one of the heartiest welcomes that it was possible for a man to give. He need not say a word about the President and his work—it would be presumptuous for him to allude to the work of Dr. Woodward. It was appropriate that he should be President of the Association, meeting as it did in this venerable mother city of the empire. He was sure it would meet with the approval of every member of the Association if he asked Dr. Woodward, their President for the year, to take the chair.

BUSINESS MEETING.

12th July, 1900.

The financial statement was read and adopted, and a vote of thanks was accorded to the Treasurer (Alderman W. H. Brittain) on the motion of Mr. BATHER, seconded by the PRESIDENT.

The following letter from Lady Flower was read, and ordered to be entered in the Proceedings:—

26 Stanhope Gardens, S.W.,
August the 29th, 1899.

Dear Mr. Howarth,—The greatness of my loss still presses upon me too heavily to be able to write much, still, knowing my dearest husband's warm interest in the Museums Association, it is comforting to receive the resolution of sympathy passed at the Brighton Conference; and I beg that you will

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kindly express to the President and Council, on behalf of our children and myself, our appreciative thanks for the same.—Believe me, yours sincerely,

(Signed) L. ROSETTA FLOWER.

The following Report from the Council on a proposed Monthly Journal was read and adopted :—

SUGGESTIONS WITH REFERENCE TO A PROPOSED MONTHLY JOURNAL IN CONNECTION WITH THE MUSEUMS ASSOCIATION.

This subject was under the consideration of the Executive Committee, and they instructed the Secretaries to obtain information.

In accordance with the resolution passed by the Council at Brighton on 5th July, 1899, "that the Executive Committee should inquire into the cost and general arrangements for bringing out a Monthly Journal, and report before January, 1900," they beg to submit the following information :—

Communications were received from the Library Supply Co., 4 Ave Maria Lane, Paternoster Row, London, suggesting that they should bring out a "Museum Record," to be the official organ of the Association.

Their first offer stated—"Apart from the cost of editing, and allowing for the probable receipts from advertisers, we reckon roughly the cost of the Journal would be £6 per month. This would cover printing 500 copies, so as to leave 250 for chance sales, presentation, specimens, etc."

The Library Supply Co. were then informed that probably the Association would prefer to appoint its own editor, and, so far as the literary matter was concerned, keep the Journal under its own control.

The Library Supply Co. replied that the Association would then be practically running the publication themselves, simply using the Library Supply Co. as commission publishers and printers, and they would do their best to help sales and secure advertisements. They proposed, as an alternative scheme, to produce a Journal of their own, the Association to receive 100 copies per month for £5, or £60 per year; at the end of the year the profit on sales of other copies, advertisements, etc., to be divided between the Museums Association and the Library Supply Co.

Estimates were then obtained from—

Messrs. Bemrose & Son, Ltd., for printing a monthly "Museum Record," 24 pages, same size as Report, in paper cover, - - - £5 7s. 6d. per month.

Messrs. William Hodge & Co., Glasgow, - - £4 10s. 0d. ,,

The schemes may therefore be tabulated as follows :—

1. Library Supply Co.—(*a*) 250 copies at £72 per annum, with any profits arising from further sales—the Association to have no further liability; (*b*) 100 copies per month for £60 per annum—the Association to be solely responsible, and to share in profits on further sales, advertisements, etc.

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2. A monthly Journal, devoted entirely to the Association, of 350 copies, printed by Messrs. Bemrose & Son, Ltd., for £64 10s. per annum.

3. The same, printed by Messrs. Wm. Hodge & Co., for £54 per annum.

With regard to the contents of the Journal, the papers and discussions at the annual meeting would probably occupy fifteen pages each month, leaving nine pages to be devoted to current notices on museum work, notes from museums on collections, exchanges, etc., reviews of books, and general official information about the Association.

Taking the lowest estimate of £54, to that would have to be added the cost of distribution and editorial charges, which would probably amount to about £20, so that the minimum cost might be reckoned at £75 per annum. Towards this would, of course, be the receipts from advertisements, sales of surplus copies, etc.

Comparing this with present expenditure on the Report, it may be pointed out that the cost of the last Report was £51 2s. The cost of distributing it and the general editorial charges for last year are not yet available, but in previous years they have averaged about £3 10s., thus bringing the cost of the Report to about £55 per annum, or £20 less than the probable cost of a monthly journal.

The present income of the Association from subscriptions is £70. There is an accumulated balance in hand of £80, and the annual expenditure is about £30, apart from the Report. So that taking the estimated cost of a monthly journal at £75 per annum, and the subscriptions at £70, less £30 for Association expenses, there would be available for the Journal £40, leaving a deficit of £35 to be made up from sales of surplus copies, advertisements, local associates' subscriptions, etc.

In the past these have produced an average of about £25 per annum, and in this way the surplus of £80 has been accumulated. It may reasonably be assumed that in the future they would produce an equal amount, which would reduce the probable deficiency to £10, and an effort should be made to secure that amount of additional annual income from new members and associates. Then it would be possible to start a Monthly Journal without any fear of financial failure.

The Council recommend that museums and institutions belonging to the Association be invited to increase the amount of their annual contribution, and that the question of the publication of a journal be still left for further consideration by the Executive Committee.

The following report on Museums Directory was read :—

I beg to report that at the Brighton meeting of the Museums Association the sub-committee appointed to consider this matter agreed to a set of questions to be put by the editor of "The Year's Art" to the curators of the different museums and art galleries throughout the country, the editor having previously promised conditionally to circularise them in time for the 1900 edition

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On 16th Oct., 1899 I wrote to that gentleman as follows:—"A. R. C. Carter, Esq., 294 City Road, E.C. Dear Sir,—I beg to enclose a copy of the queries which both Mr. Howarth and I consider might advisably be put to the curator of each museum throughout the country. The information given in reply can be easily tabulated, as I think you will agree, and should be of considerable value to every one connected with museums. You can readily arrange a system of statement that will occupy but little of your very valuable space.—Believe me to be yours truly, (signed) BEN. H. MULLEN. *P.S.*—I enclose a list of museums that are 'members,' so to speak, of the Museums Association. Of course, there are many other museums in the country, and some of those you can reach from your own list. I am sure you have already most, if not all, of those on the enclosed list. I do not think, however, you have Warrington."

To that letter I have not yet received a reply, nor does the editor of "The Year's Art" appear to have taken the promised action.

The question of producing a Museum Association Journal immediately arose, and as the opinion was expressed (in which I fully concurred) that it would be an advantage to the Association, if it could afford it, to publish the Directory matter itself in connection with the Journal, I took no further steps. And that is the way the matter stands at present. BEN. H. MULLEN.

4th July, 1900.

Resolved, on the motion of Mr. W. E. HOYLE, seconded by Mr. JAMES PATON, that the report of the Museums Directory Committee be received and entered on the minutes, and that the matter be referred to the Executive Committee to deal with, either in connection with the proposed Journal or otherwise, as may be practicable.

Resolved, on the motion of the PRESIDENT, seconded by Mr. R. F. MARTIN, that Sir William Turner, of Edinburgh, be elected President for next year's meeting, and that the appointment of Vice-Presidents be left with the Executive Committee.

Resolved, on the motion of Alderman BROOKS, seconded by Mr. E. M. HOLMES, that Alderman W. H. Brittain be re-elected treasurer.

Resolved, on the motion of Mr. C. MADELEY, seconded by Mr. A. LANCASTER, that the following gentlemen be elected ordinary members of the Council:—

E. M. Holmes, London; James M. E. Bowley, Sunderland; W. E. Hoyle, M.A., Owens College; John Maclauchlan, Dundee; John Stokes, M.D., Sheffield; F. Bennett-Goldney, Canterbury; B. Lomax, F.L.S., Brighton; H. M. Platnauer, B.Sc., York; Prof. J. W. Carr, M.A., Nottingham; B. H. Mullen, M.A., Salford; W. H. Edwards, Worcester; R. F. Martin, London.

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Resolved, on the motion of Mr. W. E. HOYLE, seconded by Mr. H. M. PLATNAUER, that Mr. E. Howarth be elected Secretary.

Resolved, on the motion of Mr. H. M. PLATNAUER, seconded by Mr. BEN. H. MULLEN, that a sum not exceeding £15 be granted to the Secretary for assistance.

Resolved, on the motion of Alderman PHILLIPS, seconded by Alderman BROOKS, that the cordial thanks of the Association be given to the Mayor and Corporation of Canterbury for the very kind and hospitable reception they have given to it in their ancient and interesting city.

Resolved, on the motion of Mr. F. A. BATHER, seconded by Mr. E. M. HOLMES, that the best thanks of the Association be given to the local committee and to Mr. F. Bennet-Goldney for the excellent and altogether satisfactory arrangements made for the conference.

Resolved, on the motion of Mr. C. MADELEY, seconded by Mr. E. HOWARTH, that in view of the extent of the action authorised by the Libraries and Museums Act, this meeting of the Museums Association express the opinion that the limit of local expenditure under those Acts should be left to the discretion of the municipal authorities concerned.

Resolved, on the motion of Mr. E. M. HOLMES, seconded by Mr. H. M. PLATNAUER, that in the opinion of this meeting of the Museums Association it is desirable that some extensive space for storage of specimens belonging to History, Ethnology, and Natural Science be suitably provided, in view of the insufficiency and cost of present museum accommodation; and, further, hopes that the proposed scheme for a National Repository will be taken into consideration by H.M. Government, and by the societies and public bodies whose interests are involved.

At the close of the meeting the President announced that it was proposed to hold the next annual congress in Edinburgh.

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ADDRESS BY THE PRESIDENT: HENRY WOODWARD, LL.D., F.R.S., F.G.S.

IT was a happy omen (I had almost said inspiration) which led the founders of this Association to invite its organising committee twelve years ago to meet in the ancient *Eboracum*, the city of the "White Rose of York," once the capital of Roman Britain, which, blazoned down the long roll of history for eighteen hundred years, still firmly stands its ground, like some ancient warrior, all scarred and weather-beaten by time, by wars, and revolutions, a landmark in our history and a light to science. Such is the fair archiepiscopal city of York, the birthplace of this institution, which in 1831 gave origin to the great British Association for the advancement of science, and still earlier founded the Yorkshire Philosophical Society.

After visiting Liverpool, Cambridge, Manchester, London, Dublin, Newcastle, Glasgow, Oxford, Sheffield, and Brighton, the members of the Museums Association have set out this year upon a pilgrimage to Canterbury, the mother city of the English people—the "Cant-wara-byrig," the capital city of the "Cant," the "Angul," or corner of Britain nearest to the Continent, towards which the immigration of those Belgic tribes into Britain in præ-Roman times was directed, and the later invasion of Julius Cæsar, 54 B.C. The cathedral, which dates from A.D., 602 was recovered by St. Augustine, its first archbishop, there having been, it is said, a church already on the spot

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built by early Roman Christians. Like York, Canterbury has been an archiepiscopal see from the earliest times to the present day, and many of its primates lie buried within its precincts.

But it is not my duty to descant upon the merits of our present happy meeting-place, or to attempt to record its history: these are matters I can safely leave in far abler hands; for among our vice-presidents I see the names of the Very Rev. the Dean of Canterbury; the Worshipful the Mayor, Mr. Alderman George Collard, J.P.; Mr. Alderman Mason, J.P.; F. Bennett-Goldney, Esq., the hon. curator of the Canterbury museum. Upon the kindness and hospitality of these gentlemen during our visit I feel sure we may safely rely, and indeed our programme holds out many agreeable promises of pleasant visits both here and in Dover during our brief sojourn in Kent.

Before entering upon the subject of my address however, I desire to express the pleasure it gives me to be able to take part in this meeting of the Museums Association, and to return my thanks to you for the great compliment you have done me in electing me to fill the office of your president for this year. I am the more glad to receive this kindly recognition at your hands, as it indicates the high estimation in which the British Museum (Natural History) is held, to which I have had the honour to belong for so many years; an institution which in 1893 furnished your Association with its then president (the late Sir William Flower, K.C.B.), and whose present director, Professor E. Ray Lankester, F.R.S., was your president at the Oxford meeting in 1897.

During the forty-two years in which I have been a member of the staff of the geological department of the British Museum, I have witnessed many important

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changes in its arrangement and administration. Even ten years earlier (in 1848) I had as a youth worked in the geological department temporarily under my late brother, Dr. S. P. Woodward, and in the zoological department under the late Dr. J. E. Gray and Mr. Doubleday.

The departments of geology and mineralogy were then one, and remained so until 1857, the year before I was appointed, when they were separated, Mr. G. R. Waterhouse retaining geology, and Professor N. Story Maskelyne being appointed keeper of mineralogy.

The great department of coins and antiquities was then one keepership. It has since become five—1. Numismatics; 2. Egyptian; 3. Assyrian; 4. Græco-Roman; 5. Ethnographical British and Prehistoric Archæology, having each its own keeper. The decade from 1848 to 1858 witnessed the building of the reading-room and many other important changes.

Until the year 1880, when the new Natural History museum buildings (ever to be associated with the name of Richard Owen) were handed over to the trustees, the departments of geology and mineralogy shared one set of exhibition galleries between them, although they had been already created separate departments twenty-three years earlier. Like "double almonds in one shell" the two kernels mutually repressed each other's growth, and the possession of every foot of gallery space was keenly contested between them.

The transfer of the collections to the new buildings, effected in 1880, gave a sense of expansive relief and a vast impetus to the growth of both departments, more especially to that of geology.

I recall that wise observation of the late Professor Dr. Ferdinand Roemer, director of the museum of Breslau, when he visited the new buildings in Cromwell Road in

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that year. "The space," said he, "provided for mineralogy is ample. Every important mineral species is now known, and the area required for such a collection can be predicated, but who shall foretell the extent of the growth of palæontology? Every new area of the earth's surface explored may in turn yield an entirely new and abundant buried fauna and flora, far exceeding in numbers and extent the relics of the buried cities of Assyria, Egypt, or Central America, because each country may represent many successive periods of geological time." This prognostication of Roemer's has been amply fulfilled by the rich harvests yielded to the American museums by the discoveries of Marsh and Cope, Scott and Osborn in Wyoming, Dakota, and Kansas; by Gaudry in Pikermi and Mont Leberon; Forsyth-Major in Samos and Madagascar; Professor H. G. Seeley in South Africa; Ameghino and Moreno in Patagonia; Dupont and Dollo in Belgium; Stirling in Australia; Gordon and Newton in Elgin; Alfred Leeds in the Oxfordian of Peterboro'; and Prof. Amalitzky in the Permian of Russia.

On the 23rd June, 1880, upon the retirement of my former chief, Mr. G. R. Waterhouse, I had the honour to be appointed his successor, and between June and October, with the help of my very able staff, the transfer of the entire geological collection from Bloomsbury to the present building in Cromwell Road was accomplished, and in April, 1881, the mineralogical and geological galleries were opened to the public. During the past twenty years the assistants in the department have laboured assiduously to bring the large and varied collections into order, and much skill and thought have been expended in planning and arranging the cases and fittings necessitated by the great accessions received and the largely-increased exhibition-space which the new galleries afforded.

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In the old British Museum, for instance, we had three galleries devoted entirely to geology, and the wall-cases of four others; mineralogy (which shared them with us) occupying the floor space. Only one of these seven galleries was top-lighted, the other six being lighted on the north side by windows, so that only three sides had wall-cases.

Gallery Space.—We now enjoy ten public exhibition galleries for geology and palæontology, whilst mineralogy has a spacious gallery to itself. We have also an excellent geological library, work-rooms, and store-rooms, far more extensive than at Bloomsbury, and a geological map-room, which also contains a students' collection of fossils.

In gallery No. 11, my colleague, Mr. Robt. Etheridge, F.R.S., has added a most valuable stratigraphical series of rocks, all carefully arranged and illustrated by maps, diagrams, and sections, showing the nature of the sedimentary series across England and Wales; the rocks following the order of a long running section placed at the top of the case, each formation being marked by vertical divisions, and each specimen labelled with its name and locality.

In the same gallery, with other historical collections, is placed the original series of fossils obtained and labelled by the late Dr. William Smith, "the father of English geology," to illustrate the fact that strata can be identified by their fossil contents, which is now accepted as a fundamental principle of geology, and has proved of the utmost value to the geological surveyor in mapping the country.

Guides.—Perhaps the most useful thing accomplished in our new geological gallery has been the production of a series of illustrated guides to the department, of which six editions and 18,000 copies have been issued. A seventh edition (largely rewritten) appeared in 1896, and a new guide to the fossil invertebrata and plants

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was issued in 1897, both of which will shortly be exhausted.

Catalogues.—A series of about twenty-eight catalogues and one monograph, most of them illustrated, have been prepared in the geological department from 1881 to 1900, and printed by order of the trustees. These add greatly to the usefulness of the collections and serve also as aids to other museums. They embrace the fossil plants, the foraminifera, the fossil sponges, the blastoidea, bryozoa, Tertiary mollusca, the cephalopoda, fossil fishes, reptilia and amphibia, the birds and mammals.

Printing Labels.—I think I may claim to have introduced into the British Museum (Natural History) the printing of labels for exhibition cases within the department, effecting thereby an enormous annual saving in expense, and a vastly increased means of production.

I have even cherished the idea of the possibility of establishing a museum labels bureau, and supplying labels at so much per 100 for the use of other museums.

Certainly such descriptive labels as Mr. F. A. Bather has put before you upon more than one occasion, dealing with some special group, such as the crinoidea or the brachiopoda, might well be supplied to other museums who happen to possess a similar series of specimens.

Our larger descriptive labels for families and classes might readily be adapted to any museum having such classes represented.

Illustrations.—Much has been done, but far more remains to be accomplished, by the introduction of illustrations of vertebrate and invertebrate animals and their structures, so as to render the galleries of museums not only instructive, but attractive to the public at large. My friend, Professor Osborn, of the American museum, New York, has issued an admirable series of enlarged

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photographs of skeletons and restorations of tertiary animals for use in museums.

Models and Casts.—Restored models and casts of types or of rare, or unusually perfect specimens may be introduced with great advantage. Coloured models might also be produced of the crinoidea, asteroidea, the merostomata, trilobita, the brachiopoda, the rudistes, the cephalopoda, some fossil fishes, reptiles, birds, and mammals, also casts of the brains of mammals for comparison.

These special objects can best be seen in our museum, but may be selected from a printed list, a revised form of which I hope to furnish shortly for the use of provincial museums. I also exhibit some casts made in our museum.

Among the various objects commenced to be carried out by the present director, Prof. E. Ray Lankester, is the arrangement of a series to illustrate animals under domestication. He hopes to be able to obtain examples of the various breeds of animals which are the result of the intervention of man, giving rise to what in Nature would almost amount to the origin of species. But it does not appear that these varieties can ever remain permanent without constant artificial environments. All the immense varieties of the dog, for example, would speedily disappear or degenerate into mongrels if not strictly preserved by man. The same is true of the various breeds of fancy pigeons: if neglected, the offspring would again revert to the common blue-rock pigeon from which they have all sprung.

Breeds of horses and cattle, under domestication, are also found to lose their distinctive points of difference and to revert to a common wild form best adapted to its surroundings. Prof. Lankester hopes to secure examples of some of these and photographs of others to serve as records and a basis for future investigations.

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An excellent piece of work just published by the trustees and edited by Prof. Lankester, is a series of small fourpenny guides—

1. Hints for removing and preparing skins of mammals.
2. Instructions for the preservation of birds.
3. Instructions for collecting reptiles, batrachians, and fishes.
4. Instructions for collecting insects.
5. Instructions for collecting arachnida, myriopoda, and *peripatus*.
6. How to collect diptera (two-winged flies).
7. How to collect mosquitoes (culicida).
8. Methods of collecting and preserving various soft-bodied animals (invertebrata).
9. Directions for collecting and preserving plants.
10. Suggestions for collecting and preserving fossils and minerals.

These are likely to prove of great use to persons travelling or resident abroad desirous to set about collecting, and wanting hints as to how to proceed. They may even be found useful to our friends at home, and to would-be naturalists everywhere.

As an interesting curiosity of natural history and also of much scientific and historical interest, is the issue by the trustees of the first fasciculus of 100 plates, out of a series of 800 folio copper-plate engravings, prepared at the expense of Sir Joseph Banks (1768-71)—130 years ago or more—illustrating the plants collected in Captain Cook's first voyage, when Sir Joseph Banks and Dr. Solander were the naturalists, and including a series of the plants collected in Captain Cook's second voyage, when the Forsters were the naturalists.

These plates have never been published, proofs only having been pulled, and a set of these, as far as they exist, bound with the original drawings, are now in the library of the botanical department of the British Museum. Illustrations of some of these plants have been elsewhere

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published, but the greater proportion still remains unfigured. The MS. descriptions written by Banks and Solander are here printed *verbatim*, with determinations and modern names added by Mr. James Britten, of the botanical department. This volume stands probably alone among deferred publications. Seven other similar volumes will follow.

Some years since (in 1887), when president of the geological section of the British Association at Manchester, I was invited to open a discussion upon the question "How a natural history museum should be arranged," and in this discussion the sections geology and biology took part.

I venture to think that some of the facts and arguments I then adduced are of equal weight and value to-day, and may even be worthy the consideration of those who (like myself) are curators by profession.

The question as to how a natural history museum should be arranged may seem, to the uninitiated, a very simple affair, and the number of persons who feel themselves fully competent to advise in the matter is always considerable. It is one, however, which has occupied the attention of many of our most able naturalists during the past fifty years, and still remains a subject for the expression of widely divergent views.

There are certain principal methods which may be seen followed out in most of our large museums.

For example, in a collection of recent zoology, the objects are usually arranged systematically according to their classes, orders, and families. But they are also not infrequently arranged to illustrate a particular country, as, for example, the British zoological collection in the National Museum or of a particular county, as is the case in the Torquay museum, in which only such

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specimens as belong to the fauna and flora or mineralogy of Devonshire are preserved.

The botanical collections may also be arranged systematically or geographically, and in the herbarium of a large museum both methods are followed.

Then there is the palæontological collection, comprising examples of fossils from strata of various ages, and often belonging, like the recent biological collections, to various countries.

Where the collection is of moderate size, this would of necessity be arranged stratigraphically, ranging from the most recent formation down to the most ancient.

Here again we may have a collection exclusively British, like that of the Museum of Practical Geology, Jermyn Street; or exclusively confined to one county, as that of Devonshire, in the natural history museum of Torquay; or we may have a British and a foreign collection, as in the British Museum (Natural History).

Again, in a large museum like the national museum, we may have special collections preserved, as the Strzelecki collection, representing the geology of Tasmania; or the Edwards collection, to represent the British eocene mollusca; or the Davidson collection, to represent the class brachiopoda; or Searles Wood's collection of crag mollusca. The palæontological collection, if a large one, may also be arranged zoologically, within its own limits, and yet be of almost equal service to the student of stratigraphical palæontology. The palæontological collections in the national museum are mainly thus arranged.

A few museums, as that of the Royal College of Surgeons (where the collection of fossils is of limited extent), the museum of Copenhagen, and the museum of Cambridge, Massachusetts, have the recent and fossil forms intermingled in one series, irrespective of their

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geological history. But this method, although designed to teach biological facts and convey certain evolutionary ideas, obliterates more than an equal number of other facts and renders it impossible to convey many important ideas bearing upon the past life-history of the earth.

In by far the greater number of museums, both in Europe and America, the zoological, palæontological, and botanical collections, are kept distinct from one another, even under separate management, often in quite separate buildings, and always in separate galleries.

It may be well to inquire how the present method of arrangement has been brought about, and what are the several arguments adduced for and against its retention.

Fossils when first observed were looked upon as *lusus naturæ*, or were attributed to the "plastic force of Nature"—a convenient and high-handed way of explaining away what one didn't understand and so trying to get rid of a difficulty; or they were attributed to that never-to-be-forgotten but always-to-be-remembered catastrophe, the deluge.

It is less than one hundred years since it became obvious to Dr. William Smith (the so-called "father of English geology"), and soon after to a host of other observers, that distinct kinds of fossils occurred in rocks of different ages, and were not infrequently found to be peculiar to certain formations. This led at first, with some, to the mistaken idea that each formation represented a separate act of creation; but when this prejudice was gradually overcome, we began to learn from our Lyell the true story of the fossils in the rocks, and that, however imperfectly preserved for our study, they still tell the life-history of our earth, from the period of its first dawn down to recent times and modern history.

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Geologists had, it is true, become so engrossed with these earlier chapters of the history of the earth, that only a few palæontologists, and a very few zoologists and botanists, saw the importance of uniting the life-history of the past with that of the present, as connected parts of one great whole.

Amongst botanists the name of Robert Brown must be mentioned as one who early appreciated the importance of the study of ancient plant life and its connection with living vegetation, and he directed that his collection of fossil woods, showing structure, should be preserved with the recent woods for comparative microscopical study.

But as regards leaf-forms, it must be confessed that the botanists have not looked with much favour upon fossil phytology—indeed Hooker and Bentham in their great work, "Genera et Species Plantarum," omit any reference whatever to fossil plants of any kind.

With a few exceptions, the palæobotanists have had to carry on their studies without help or encouragement from the workers in living forms. But so earnest indeed have they been in their work, that they have actually obtained, in many instances, the warm approval of botanists of eminence who have examined it.

Heer, Ettingshausen, de Saporta, Lesquereux, Newberry, Gardner, Kidston, and Seward may be mentioned amongst those who have specially taken up palæobotany and palæophytology, and have made themselves more or less thoroughly acquainted with living plants in order to carry on their studies of the fossil ones; some indeed, like Heer and Seward, being eminent as botanists also.

In the Mollusca the name of the late Dr. S. P. Woodward may be cited, and in the brachiopoda that of the late Dr. Thomas Davidson, as examples in the past of workers

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in palæontology who carefully studied the living forms in order correctly to understand the fossil ones.

The same remark holds good in regard to the study of fossil insects, in which Dr. S. H. Scudder and the late Dr. Oswald Heer, Charles Brongniart, and others have done such excellent work by carefully studying the living forms before describing the fossil ones.

And this is indeed true of the workers in almost every other group of extinct forms—Hinde in the protozoa and porifera; Bather in the crinoidea and brachiopoda; Gregory in the echinoidea and bryozoa; Traquair and Smith Woodward in fossil fishes; Andrews in reptilia and birds; Forsyth-Major and Lydekker in recent and fossil mammalia; Crick in cephalopoda; Newton in mollusca.

What has been the effect of this renaissance on the zoologists? They are beginning also to realise the necessity of studying extinct as well as recent biology, and the once neglected subject of palæontology is receiving earnest attention from a large number of new zoological students, and a wide impetus has thus been given to the study of extinct forms of life. But so long as a hard and fast line was drawn between living and extinct, the workers of the one school never felt in touch with or interested in the students of the other. Hence the arrangement of museum galleries and collections has always followed on the same separate lines, and, with rare exceptions, has so continued down to the present day.

Two important factors have operated most largely to obliterate this line of separation between the past and present:—(1) the discoveries of an entirely missing chapter in our earth's history, that of prehistoric archæology, which commenced to be made known about 1858, and the writing of which has continued down to the present

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time, by which "the age of man" has been carried back enormously into newer tertiary time, and that of the "extinct mammalia" has been prolonged greatly and rendered contemporary with early man, and brought into line with the living fauna and flora of to-day; in fact, linking the latest chapter of geological history to the oldest records of our race and so to the dawn of the present; and (2) the enunciation, at the same period, of Charles Darwin's Origin of Species and the doctrine of evolution, which riveted into one the whole chain of life from the earliest archæan rocks to the full tide of existences which we see around us now.

In order, then, that we may benefit permanently by the great advances made of late in natural knowledge, we must be prepared to make many changes and sacrifice many cherished ideas, and may find ourselves travelling along new lines, guided by new lights, or perchance may have to make our own lines, and even to advance under hostile opposition to carry out our new ideas. *Festina lentè*, then, must be our motto.

In 1887 I pointed out some of the difficulties which naturally arose when an attempt was made to re-arrange an entire museum collection upon new lines. *Firstly*, there is public opinion to be considered; *secondly*, in a great museum like that of the British Museum (Natural History) there is the organisation of the entire staff which is arranged like the collections in departments, each under its own keeper; *thirdly*, there is the cost of alterations, which, in a large collection, is very great; *fourthly*, there is the matter of convenience.

1. *Public opinion* is, I find, still very largely in favour of keeping the geological collections apart and separate from the zoological, principally because the people who use the collections are still interested in them according

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to the special section which they are studying and the text-books which they have been reading; and they come to see the living birds, or beetles, or butterflies, the African antelopes, or the recent shells, and don't want to see the fossil ones. Or, again, the student is only interested in ammonites, or in trilobites, or fossil fishes, and wants to see what we have in one or other of these special groups. For, after all, the human intellect is, as a rule, restricted to what it studies, reads, pursues, or collects, and it is only rarely, nowadays, that one meets with the all-round genus, "the naturalist," who has acquired a more or less wide knowledge of every department of natural history, and takes a keen and lively interest in all. Such was our late valued friend, the Rev. H. H. Higgins, M.A., for so many years the leading light of the Liverpool museum, and the first president of this Association.

Happily for science and the public at large, such also are many of the members of this Association—the curators of our great provincial museums, who having, by reason of their position, to deal with *omnibus rebus et quibusdam aliis*, do so cheerfully, setting aside their own special pursuits and taking up whatsoever their hand findeth to do, they do it with their might.

2. The organisation of a museum into departments, each with its own head, is almost fatal to amalgamation, and although under the late Sir William Flower, and the present director, Prof. E. Ray Lankester, much has been done towards breaking down this hard demarcation, the departments remain separate and distinct to this day.

3. The question of cost is always a serious one, as the cases suitable for one series of exhibits are often unsuitable for another, *e.g.*, mammals and birds.

The late director commenced in 1895 (on the

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retirement of Dr. A. Günther) to remodel the zoological department, and with the assistance of Mr. R. Lydekker, F.R.S., to re-arrange the mammalia, and with Dr. R. Bowdler Sharpe and Mr. R. Ogilvie Grant the birds. After two years and a half his health broke down entirely; his co-worker, Mr. Lydekker, has continued the task to the present time, but still the great work remains unfinished.

A single series, occupying a special room, contains the most important finished piece of Flower's work and his last, the cetacean gallery. In this room are exhibited, either as models, skins, or skeletons, 38 of those huge marine mammals, the whales, giving as far as can be done in so limited an area, 124 feet by 44 feet (far too small a space to show objects of such huge size), a fairly complete illustration of this curious aquatic group.*

Professor Lankester has lately added the small series of fossil genera from the geological gallery; so that in this one section at least the aspirations of the most advanced biologist have been realised, and we see the broken relics of the past placed beside the most complete living examples that can be obtained of this remarkable group.

[I find I cannot enter into the question of cost for obvious reasons.]

4. There is the matter of convenience. Again we repeat, *Festina lentè!* In affecting any important change, whether in business or in science, it is unwise to advance faster than public opinion and the education of the people will admit.

In public museums, the collections must be so arranged

* Stuffed specimens, 13; skeletons with half the skin modelled in papier maché, 8; other skeletons of cetacea, 15; 1 cast of Sowerby's beaked whale, and 1 model of the Greenland right whale.

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as to render them attractive to, and readily to be comprehended by, the public at large, who help to support these institutions. This is not easily done by mixing the whole of the fossil and recent collections together. Nor would the cases lend themselves to such an arrangement; for it is obvious to any one that the exhibition cases best adapted for the display of fossils would be unsuited for objects of recent zoology.

Intelligent members of the public coming to work at the collection would certainly not be thankful for a re-arrangement, which would intermingle, for example, the already extremely long series of recent shells with the almost equally long series of fossil ones, whilst the worker at the latter would be hopelessly seeking, without a guide, for some species of oolitic or carboniferous mollusc, once readily accessible, but now masked amid the hundreds of other forms, too many of which would be doubtfully placed in families or even genera where perhaps they had no kinship whatever.

Such comminglings of the dead and long-buried past amidst the gay crowd of modern life-forms rather suggests that wreathed skeleton which presided at the feasts of the Egyptians—a *memento mori* rather than a *modus vivendi*. Are there not, in fact, more aspects of a palæontological collection that may be studied with advantage than that of its connection with living forms, however important that undoubtedly is? Surely the chronological aspect of life-forms is worthy of our attention! And is not their geographical distribution in past times also deserving of study? These and many other equally interesting subjects of inquiry would be to a great extent obliterated by the general commingling of recent and fossil forms together.

The plan which I proposed at Manchester, and which I

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have to some extent carried out in my own galleries, is the introduction in some conspicuous place, amongst the fossil remains of each class, order, or family, recent types representing characteristic living forms for comparison with the earlier extinct ones. Thus, near the remains of *Hyperodapedon* and *Rhynchosaurus* from the Trias, I have placed the living *Sphenodon* or *Hatteria* from New Zealand; near the miocene *Crytobranchus* from Oeningen is exhibited the skeleton of the gigantic salamander from Japan; with *Testudo gigas* from the Sewaliks is placed the modern *T. elephantopus* from South Africa, the *T. grandidieri* from Madagascar, and the photograph of the living *T. vicina* from the Galapagos Islands; with the remains of the extinct proboscidea I have placed the skeleton and other remains of the Indian and African living species; with the extinct Sirenia the modern manatee and dugong; with the extinct Glyptodon is placed the modern armadillo; with the giant *Megatherium* the skeleton of the existing tree-sloth; with the great *Diprotodon* of Australia that of the wombat and the kangaroo; with the extinct flightless birds of New Zealand and Madagascar the skeleton of the modern ostrich and the living apteryx; with the remains of the musk-ox the skeleton of the living animal; some of the recent crinoidea are shown beside the fossil forms; with the extinct cephalopoda I have arranged models, diagrams, shells, and animals of the living species.

This limited introduction of existing forms, aided by diagrams, drawings, and separate parts, does not break up the arrangement of the collection as a whole, but vastly enhances its usefulness to the student.

Acting in concert with Professor Flower (ten years later than when I read my paper at Manchester) I find that my colleague, Mr. R. Lydekker, in arranging the recent mammalia on the west side of the building has followed

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precisely the same course. He has put in original specimens of teeth or skulls, or coloured casts, or photographs or drawings of the principal extinct orders, families, and genera, along with their nearest living representatives side by side. More than this it has been found impossible to accomplish in the space at his disposal, and even to do this, the collection of recent specimens has been largely reduced in the number of its individual exhibits.

Should the opportunity arise of arranging a large museum afresh, I have suggested, long since, what to me appears to be an admirable method by which the recent and fossil series may be brought into line. It is to place the collections of, say, recent and fossil mollusca and recent and fossil echinodermata, corals, etc., in a parallel series of cases in adjoining galleries, or in one gallery, in two corresponding rows of cases, so that one might study either or both series as occasion required. This plan of bringing the present and the past into close proximity to one another, without intermingling, would, in my opinion, give all the facilities required by the student or the man of science for the freest possible study and comparison of species, living and extinct, which the most sanguine advocate of reform could possibly desire, consistent with the best use being made of the collections and for the convenience of the greatest number of workers.

Since 1889 your Association has published in its Proceedings many interesting accounts of various museums, both at home and abroad, but not arranged in any way as a whole.

Might it not be possible for your council to collect (by command), compile, and bring together as a handbook, an account of every provincial museum throughout the country, giving full particulars of each, not only as

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to its officers, its organisation, and its plan of arrangement, but also what are the chief features of its exhibits, and especially to print any records concerning types and figured specimens preserved in its collection, and any other particulars of general public interest? The printing of such a volume would be a very proper task for your Association to undertake, and would be of the greatest value to the members themselves as well as to scientific men in general.

If time admits, I trust that we shall have before us descriptions of two important provincial museums, at least—one, that of Worcester, from its curator, Mr. William H. Edwards; the other I hope to speak of myself, namely, the Norwich museum, situated on the site of the ancient *Venta Icenorum* in East Anglia, which I claim as my birthplace, and which I trust the members of this Association will visit at no distant date.

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CANTERBURY AND THE ROYAL MUSEUM.

By F. BENNETT GOLDNEY, Hon. Curator.

I UNDERSTAND that it is an unwritten rule of your Association that the local curator—or should I say director?—should give a short account of the museum and city which in turn is honoured by your presence. My remarks must necessarily be very brief. As the Mayor has well said, the city of Canterbury is a museum in itself. Without entering into any speculation as to what kind of settlement may have existed on the primeval swamp where Canterbury now stands in the "palæolithic" or "neolithic" ages, or even during "the age of bronze," it is enough to say that the existing ground plan of the city points conclusively to the fact that a populous community had here established a permanent dwelling-place, surrounded by an entrenchment, at a period certainly not later, and probably considerably earlier, than the close of the "prehistoric iron age." That the strongly-entrenched camp in Bigberry Wood, about a couple of miles away, was the *oppidum* or fortified refuge of the inhabitants in times of danger, is no less certain, and all the probabilities of the case seem to indicate that this was the identical stronghold, "admirably fortified by nature and art," captured by Julius Cæsar immediately after his second landing in Britain. And here I would humbly offer a suggestion to my brother curators of other museums in which any antiquities belonging to this period are preserved. In nearly all our museums, from the British

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Museum downwards, are to be found, and, generally speaking, conspicuously displayed, a number of objects of singular variety and interest, dating roughly from about 150 or 200 B.C. to about 450 or 500 A.D. In our great national collection—and the example has naturally been largely followed elsewhere—these objects are always classified as "late Celtic." Now, I venture to suggest that this nomenclature is altogether misleading. Cæsar tells us that in his day, and for some considerable period before his arrival in Britain, the whole of the tribes in the maritime parts of our island (and we know that what he terms "the maritime parts" stretched far inland) were Belgic. We know further that from the days of Cæsar to our own, there has not been anything even remotely resembling a Celtic immigration into Britain. It follows, therefore, that in South-Eastern Britain the whole of the non-Roman antiquities belonging to this period of some six or seven centuries would be correctly classed as Belgic. Belgic, therefore, I propose to label them here, and I am not altogether without hope that in time other museums may adopt the same designation. "But," say the distinguished archæologists who have introduced and maintained the term "late Celtic," "the Belgæ themselves were probably 'late Celtic,' and the use of the word Belgic in this connection might give rise to misconception." Far be it from me to pretend to decide the ethnological relations of the Belgæ. The controversy has raged for centuries already. It is still in full blast. "Not mine a strife so mighty to decide." But I may be allowed to point out that the employment of the term "late Celtic" does pretend to decide it. The very word assumes that "Belgic" is synonymous with "late Celtic" in the teeth of Cæsar, the best, and almost the only real authority on the subject, who tells

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us that the Belgæ were "not Celts." Cæsar, of course, may have been wrong, and the museum authorities may be right; I am not holding a brief for one or the other. All are agreed on one point, that these antiquities are Belgic antiquities, while all are very far from being agreed as to their being "late Celtic" as well. Surely it is better in a museum intended, among other things, to convey accurate information as to the objects it contains to make use of a word, simple, intelligible, and universally admitted to be correct, than of one which assumes the truth of a theory which is still under discussion, and which after long debate appears to be further off than ever from being finally established. With regard to possible misconstruction of the word "Belgic," moreover, I may be allowed to point out that no student of antiquities is likely to confound the Belgic tribes which Cæsar found settled in Britain with the Belgians invented by the Congress of Vienna. On the other hand, while there are plenty of contemporary "late Celtic" antiquities properly so called found in Ireland, Scotland, Wales, and the originally Celtic portions of England, they possess characteristics of their own which render them almost always easily distinguishable from those found in the originally Belgic districts of our island. To lump them all together, therefore, under the generic name of "late Celtic" seems to me to introduce a quite gratuitous element of confusion into scientific nomenclature, and to exaggerate instead of as far as possible diminishing the errors which necessarily wait upon the heels of all too-sweeping generalisations. This interruption in my account of early Canterbury has, I fear, been all too lengthy; but it may serve, perhaps, to bridge over the lamentable interval in our history, during which took place the gradual decline of Roman domination and

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the equally gradual partition of England among the Anglo-Saxon royal houses. At this period, when the events connected with the mission of St. Augustine are illuminated by a gleam of authentic history, Canterbury is not merely a royal city, it is the capital of a kingdom in close connection with the Frankish kingdom on the Continent. Nothing, perhaps, is more striking in the general state of affairs revealed, when we thus return to the actual history of Kent, than the absence of any trustworthy evidence to show that any cataclysmal disturbance had convulsed the country during the interval in which the transference of political power from the Roman Empire to the local Anglo-Saxon dynasties had taken place. A mighty evolution it was, no doubt, but it was apparently gradual, and the many wars which took place in Kent and South-Eastern England were—so far as any evidence at all is available—struggles for mastery between rival kings and chieftains of the same race and nationality rather than territorial conquests by an alien and intrusive people. Of the Celts—except as the scattered and powerless survivors of a long subjugated race in this part of England—there is no trace in authentic history. The preposterous theory (pardon me the word) that the forefathers of the Welsh in this part of our country were suddenly "effaced," "obliterated," "exterminated," by the forefathers of the English during the fourth and fifth centuries of our era finds not a shadow of corroboration in any chronicle that can stand the test of criticism or any monument of the time, great or small, which has come down to us. In Kent, and I am now speaking only of Kent, the Roman domination merges into the Anglo-Saxon domination without a break. And here, in passing, it may not be out of place to remark that considerable stress has been laid in support of the cataclysmal theory, on the evidence

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that many Roman buildings and fortresses were destroyed by fire. That they were actually so destroyed is, in many cases obvious enough, but it may be asked, how else were they likely to be destroyed? Are we to regard the last terrible conflagration in New York as due to an immigration of hostile Anglo-Saxons on the docks at Hoboken, and the charred remains of the woodwork as evidence that all the Celts of Tammany have just been suddenly exterminated? The evidence is certainly as good in one case as in the other, and in both cases the historians may safely be left to appraise its value. Of the actual kingdom of Kent and its fluctuating fortunes, until the time when a scion of the house of Kent was called upon to be ruler of all England in the person of Ecgberht, it would be impossible to speak without trespassing too largely upon your time. Canterbury lost its distinction as the capital of a small kingdom, to become a royal city in the larger hegemony she had incidentally done so much to create. For it is certain that the establishment of Christianity as a national religion in Kent, which resulted as a consequence of the preaching of St. Augustine, rendered the subsequent political union of the whole of England a far easier task than would otherwise have been the case. From the time of the conversion of King Ethelberht, thirteen centuries ago, Canterbury became not only the civil and political capital of Kent, but the ecclesiastical capital of Christianity in England; and while the temporal sovereignty has been for more than a thousand years merged into the sovereignty of England, Canterbury has continued to be the seat of the Primates of All England and Metropolitans from that day to this. The Danish invasion left more than one cruel scar on the fair face of the city, and the later Norman Conquest gave her into

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bondage to the Conqueror's own rapacious half-brother, Odo of Bayeux. The tradition of the means by which the men of Kent secured the confirmation of the liberties by the Conqueror is, doubtless, mythic; but the fact that they did by some means or other obtain special immunities and privileges is a fact witnessed by still extant practical evidence in the shape of the legal recognition accorded to the local custom of "gavelkind." From the Conquest onward, the history of Canterbury is part of the history of England, the principal local event which differentiates the chronicles of our city from those of other English cities being the martyrdom of the archbishop—St. Thomas of Canterbury. For more than two centuries afterwards Canterbury was a shrine for pilgrims from the whole of Christendom, only second in popular esteem, if second it was, to that of St. James of Compostella. Hither it was that the joyous company immortalised by Chaucer came riding by easy stages from the "Tabard" in Southwark. Here it was that in later days, on the eve of a mighty religious revolution, the kindly Erasmus and the somewhat censorious Dean Colet were shown the accumulated treasures of the shrine. If Canterbury itself is a museum, Christchurch was at that time a museum within a museum—crowded not only with relics dear to the eyes of faith, but with objects of classic, no less than mediæval art, nearly all unique, most of them of surpassing interest, and many of them of inestimable money value. All have been dispersed, nearly all irrevocably lost. Our churches and our municipal museum can still show many objects of varied interest to the Canterbury pilgrim of to-day, but the loss of those monuments of early art is irreparable for ever. I do not propose to enumerate any of the various objects which are to be seen in the Royal museum—I will leave

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them to speak for themselves; I will now only add a few words about the museum itself. The Royal museum owes its origin to the private enterprise of some of the more prominent of the citizens of the city in the first quarter of the present century, when a local society, known as the "Canterbury Philosophical and Literary Institution," decided to add a museum to their already considerable library of books. To guide this early museum through the intricate paths of its childhood, the authorities in power created six directors, seven sub-curators, one secretary, one treasurer, one exhibitor, and one curator. To them we owe many of the exhibits still to be seen in the present cases. These exhibits would have been more numerous had not pre-Lubbock holiday-makers decided that gold coins and other valuables were worth "annexing" even in middle Victorian days. The old society came to an end in the year 1858, when the Corporation adopted the Public Libraries Act, and to their lasting credit in those early times, bought up the museum building, library, and collections, and added them to their already numerous municipal treasures. The Mayor has said something about the advantage of a museum belonging to a corporation which is "eternal," and not to a society which may fall into hard times. Nowhere can an illustration of the wisdom of the Mayor's remarks be better seen than in Canterbury. Innumerable objects of local and therefore of national interest have been lost to Canterbury for ever, simply because the old society was too poor to buy what the Corporation would have been only too thankful to have obtained. I believe there has been some little friction lately concerning some Irish-Celtic gold ornaments between the Irish authorities and the British Museum. The Mayer collection of Anglo-Saxon antiquities found in and belonging to East Kent is still, however, available

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for antiquarian students in Liverpool. In 1895 the news reached the city that a native of Canterbury, who had amassed a considerable fortune at the Antipodes by his great success in the practice of surgical operations of a character perhaps in some cases open to question, had left a considerable sum of money for the benefit of his early home, where his near relatives have since died in almost complete poverty. The authorities in Australia tried to prevent the testator's wishes from being carried out, and this present building would not have existed had it not been for the public spirit and private munificence of the present Mayor of Canterbury, the chairman of the Museum Committee, Alderman Mason, Alderman Hart, and other members of the Corporation, who decided to fight the case on their own personal responsibility. Canterbury was successful. Eleven thousand pounds arrived from Australia, with a certain number of colonial portraits of the testator, and a condition that they should be hung in the most prominent position of the proposed building, and the Corporation having obtained the consent of the Charity Commissioners, the money left for the purpose "of an Institute for Working Men" was applied to the provision of a "new museum and free library." The present buildings have cost the Corporation about £16,000, and, though the original £11,000 has thus been exceeded by £5000, the Corporation can only be congratulated on their very judicious extra expenditure, which not only enables the museum and library to be adequately housed, but adds an additional attraction to the many thousands of modern pilgrims who still help in so large a measure to bring prosperity to the city. I must mention among our private benefactors, Mr. Joshua Cox, who furnished all the reading rooms and libraries at his own expense; the present Mayor, Alderman

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Collard, who has given 200 guineas for the purchase of books for the reference library; Mr. W. O. Hammond and the late Miss Lawrence, who purchased the museum cases, Lieut.-Colonel Copeland, Mr. Ingram Godfrey, and Mr. Pugin Thornton also have presented very valuable collections of pre-historic, Roman, and Anglo-Saxon antiquities, Italian and English engravings and etchings, mediæval carvings in ivory, and other curios. These, with my own presentations to the museum of specially local antiquities and my loan collection of pictures, English earthenware and porcelain, and other works of art will, I hope, speak for themselves when you visit the rooms upstairs. I will only add that we are supported by a rate, that the building is managed under a committee of the City Council by the hon. curator of the Natural History Section, who has given up much valuable time to the arrangement of the collections under his charge, a librarian, two assistants, and a boy, as well as the hon. curator of the Royal museum, who is also the hon. librarian.

No discussion ensued, but the President thanked Mr. Bennett Goldney for his paper, and paid a high tribute of praise to the labours bestowed upon the Royal museum both by that gentleman and Mr. Stephen Horsley. The Canterbury museum, like many others, owed much to its unpaid staff.

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"HASTINGS" MUSEUM, VICTORIA INSTITUTE, WORCESTER.

By W. H. EDWARDS, Curator.

THE museum was founded in 1833 by the Worcestershire Natural History Society. It increased rapidly, and in 1835 a new building—known as the "Hastings" Museum—was commenced. This was opened in 1837 by the late Sir Charles Hastings, M.D., F.G.S.

On the adoption of the Free Libraries Act in 1879 it was thought desirable to amalgamate the library and museum into one building, and after considerable negotiation the library committee purchased the building for £2820, when the Natural History Society handed over the whole of the specimens in the collection free to the corporation.

In a comparatively short period there was not sufficient room to properly display the vast amount of material which had accumulated during the sixty-three years that the museum had been in existence. This led to further developments; subscription lists were opened, and the present building—called the Victoria Institute—was erected as a Jubilee memorial at a cost of about £43,000, and opened to the public in October, 1896.

The present building now includes, in addition to the library and museum, an art gallery, and science, technical, and art schools.

Time did not allow of a proper arrangement of

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the collections for the opening ceremony, but this has since been taken in hand and is proceeding gradually. The collections are now being arranged to form (1) an "index" or "type" series, as far as existing material and funds will allow, and (2) a "local" series, which it is hoped to make as representative as possible of the flora, fauna, and antiquities of Worcestershire.

The collections, which contain upwards of 30,000 specimens, are exhibited in five galleries on the upper floor and a large basement, the total floor area being about 4638 square feet. Owing to the comparatively small size of the rooms it was found necessary to arrange all the upright cases against the walls as wall-cases for the vertebrates, antiquities, etc., while the centres of the rooms are occupied by table-cases containing the invertebrates, minerals, and fossils.

The system of classification adopted has been to commence with the protozoa (as the lowest invertebrates) in the table-case in Room I., and by following the central cases through the adjoining room, the remaining invertebrates (up to the tunicata) will be found in consecutive order. Returning by the wall-cases, the visitor follows from the fishes and reptiles, through the birds, to the mammalia.

Taking the rooms in order—

Gallery I.—Contains the general collection of mammalia in the wall-cases, and a central table case contains invertebrates from the protozoa to the end of the cœlenterata. Size of room, 25 feet 6 inches by 20 feet.

Gallery II.—The wall-cases accommodate the large collection of foreign birds, amongst them being a number of interesting specimens, many of the Australian birds having been presented by the late Mr. J. Gould, F.R.S. The invertebrates are continued in the five central table-cases, ending with the tunicates.

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In this invertebrate series is included the splendid conchological collection presented by Sir George Whitmore, K.C.H., and said by experts to be one of the finest provincial collections in England. Two window-cases in this room are occupied by a series of life-history groups of insect pests. Size of room, 48 feet by 20 feet.

Gallery III.—Contains the small general series of fishes and reptiles in part of the wall-cases, while the other portion has been set apart for British birds which do not occur locally, the object being to form a fairly complete series of British birds when combined with the local ones, which are shown in the adjoining room. The two central table-cases, and a long desk-case underneath the windows, contain a very good representative collection of minerals. Size of room, 24 feet 6 inches by 24 feet.

Gallery IV.—Contains a very good collection of local birds (many of them being very rare) in the wall-cases, which it is hoped in the near future to mount as life-history groups. The two large table-cases in this room contain the local geology (in part), of which there is a very good typical series of specimens representing the pre-cambrian, cambrian, silurian, old red sandstone, carboniferous, nermian, new red sandstone, lias, oolite, and pleistocene systems, all of which occur in the district. This collection has recently been re-arranged and classified in stratigraphical and zoological sequence, with specially written descriptive heading labels for each system. Size of room, 26 feet 9 inches by 24 feet.

Gallery V.—The local fishes, reptiles, and mammals, together with the noted Strickland collection of bird skeletons, occupy the wall-cases in this room, while the central table-case contains a continuation of the local geology. One wall of this room is occupied by a large herbarium case containing many thousands of dried plants, which it is intended to

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arrange into local, British, and foreign collections. A few local antiquities are also temporarily displayed in this room, but these will eventually be placed in the basement where the general ethnological collection is exhibited. Size of room, 25 feet by 18 feet.

Basement.—A long length of wall-casing here contains the extensive ethnological collection, which includes a large number of interesting specimens collected during the voyage of the surveying ship "Rattlesnake." The series is arranged in geographical order, but at present is badly in need of more labelling. The seven table and three long desk-shaped window-cases accommodate the general geological collection, of which there is a very good representative series displayed; this, like the local collection, is arranged in ascending stratigraphical and zoological order, with descriptive heading labels for each system. Size of room, 65 feet by 25 feet.

The PRESIDENT heartily congratulated the curator and authorities of the Worcester museum on the enormous progress made during the last few years. He had visited the museum ten years ago, and again within the last two years, and had been greatly impressed by the advance that had been made in that interval.

Mr. S. SMITH said that he was in a position to heartily endorse the President's remarks from his own personal experience. He felt, however, that in comparing the past and present positions of the Worcester museum we should not forget that the late Mr. Rees worked under considerable disadvantages. He was a self-educated man, and though a first-rate conchologist, and one who greatly added to our knowledge of local shells, he had not had the all-round training necessary for a museum curator.

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THE HORNIMAN MUSEUM, FOREST HILL, LONDON, S.E.

By RICHARD QUICK (Member of the Japan Society), Curator.

BEFORE describing the construction and arrangement of the present new building for the Horniman collection, it will be as well, perhaps, to give a rough outline of the old museum.

Mr. Horniman started collecting thirty or forty years ago, and, by degrees, one room was filled and then another, until he gave his whole house up to his treasures, and removed to one close by called Surrey Mount, the grounds of which joined his former residence.

The museum in its early days was known as the Surrey House Museum, and was thrown open to the public free on Bank holidays.

In 1890 Mr. Horniman determined to throw the collection open entirely three days a week (Monday, Wednesday, and Saturday), and it was publicly inaugurated by the late Sir Morrell Mackenzie on 24th December, 1890. On 26th December, 1893, an extension of the museum was opened by Sir Somers Vine; and again on 1st June, 1895, Lord Battersea opened the gardens adjoining the museum to the public, on the same days as the museum, and also on Sunday afternoons.

Mr. Horniman has been an ardent collector for the past forty years, his travels in India, Burma, Ceylon, China, Japan, Egypt, Canada, and the United States,

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and elsewhere having enabled him to make important additions to his collection from time to time.

Up to the time of the closing of the old museum on 29th January, 1898, 455,591 visitors had passed the turnstile.

The New Museum.—The architect for the new building is Mr. C. Harrison Townsend, F.R.I.B.A., and the design is in the free Renaissance style.

The foundations were commenced on 6th June, 1898 and finished on 9th September, and the superstructure was started on 26th October. On 16th November the foundation-stone ceremony was performed by Mrs. Frederick John Horniman.

The building consists (speaking roughly) of two spacious galleries lighted from the top, and a clock tower.

The frontage of the building and the tower are of Doulting stone, the remainder being of red brick. The main entrance gives access, through a small vestibule, to a lofty hall or gallery, called the South Gallery, which measures 100 feet by 47 feet. The roof is supported by five iron ribs, the centre of each of which is 38 feet high from the floor. Running round this is a balcony 12 feet high from the floor and 6 feet wide, it being also on the same level as the floor of the North Gallery, which is of precisely the same size as the South Gallery.

On the east side there runs a corridor (9 feet wide) the entire length of the building, having openings into it from each gallery. Above it are the curator's and naturalist's rooms, a room for the study of entomology (31 feet 3 inches by 16 feet 6 inches), the reference library (containing the works relating to the various departments in the museum, in all about 6000 volumes), various store-rooms, a dark room fitted up for photographers,

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and three rooms for the caretaker, as well as lavatories for both ladies and gentlemen.

The clock tower, which is nearly 100 feet high, forms also an apartment over the entrance hall, with windows looking east and west, which is set apart as Mr. Horniman's private room; above this is a room for two water tanks or cisterns, and over this comes the clock, with four opal glass dials. It will be illuminated by electric light. Above the clock is another chamber with two additional water cisterns; these are for giving pressure for the heating apparatus boiler, and also for working a small fountain in the forecourt.

The tower is surmounted by four solid stone turrets, which are richly carved.

The front of the building is enriched with a large and handsome mosaic panel, 32 feet long by 10 feet 3 inches high, which has been designed by Mr. Anning Bell. The panel contains figures symbolical of art, science, industry, etc. Each figure is about 8 feet high. The panel is entirely made of pieces of coloured glass on a foundation of mastic cement.

The building is heated throughout with 4-inch hot water pipes and radiators, and the electric light is installed. The building is of fireproof construction. The ceilings and floors are of concrete and iron, the latter covered with wood-block flooring.

The Arrangement.—I now come to the arrangement of the contents of the museum.

Each gallery has been divided into five bays of 20 feet each, fitted with wall-cases. These cases are made of solid mahogany, with ½-inch plate glass in one whole sheet, 7 feet 6 inches high by 3 feet wide each door; depth inside, 1 foot 10 inches. Each of these bay-cases contains six divisions against the wall and three standing out at

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right angles, opposite the five iron ribs. The end wall-cases are 30 feet long, with ten divisions or frames; they are fitted with Tonk's shelf fittings.

Under two of the doors in each bay there are drawers for labels and duplicates, with locks and sunk handles.

Centre table-cases are placed in the middle of each bay, and odd cases in the other spaces. The cases are numbered, and the departments and specimens follow in consecutive order.

The museum collection is first divided into two—Art and Nature. In the former, everything is arranged subjectively and not geographically, as will be seen by the following departments.

Archæology and Prehistoric Antiquities.—A table-case here contains a fine collection of neolithic flint implements from Denmark, also a very good collection of carib stone axes, etc., from the West Indies. Then follow specimens illustrating the bronze and iron ages.

Pottery is divided into ancient, mediæval, and modern of all nations.

Glass and Enamel.—Showing a series of specimens illustrating the history of glass-making from the earliest times.

Carvings from different countries, sub-divided into carvings in (1) stone and marble; (2) ivory and horn; and (3) wood; showing the characteristic forms of art prevailing at various times and places, and including doors, screens, panels, figures, and boxes.

Metal Work, comprising objects made of different metals, from various countries.

Armour, including both European and Oriental collections, also horse furniture, etc.

Locks and Keys, illustrating the history of primitive locks, keys, and padlocks, showing their gradual develop-

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ment from the ancient Egyptian wooden lock up to a complicated Chubb.

Religious Objects.—Collection illustrating the various religions by their objects, idols, furniture, etc., sub-divided as follows :—

1. Buddhism.
2. Brahmanism or Hindu mythology.
3. Jainism—Those who worship saints or Jins.
4. Shintoism, Taouism, Confucianism in China and Japan.
5. Christianity.
6. Charms of a religious type.

Religious Buildings.—A collection of models of various religious buildings.

Bells from various countries, gongs, rattles, etc.

Lamps and lighting apparatus from different countries.

Musical Instruments from different countries, divided into (1) string, (2) wind, (3) percussion.

Pipes.—A collection showing the evolution of the tobacco pipe ; specimens from all parts of the world, and of the art displayed on them in different countries.

Jewellery from various countries—from savage to civilised.

Toys and Games from various countries ; native manufacture.

Means of Transit (*Models, etc.*).—Collection of models showing the evolution of the means of transit and conveyance, ranging from the primitive surf-boat and canoe of the Indians, palanquins, jinrickshaws, Sedan chairs, etc., up to a modern locomotive engine.

Ethnography (*Primitive*).—Including specimens of clubs, spears, bows, arrows, paddles, bowls, gourds, mats, baskets, etc.

Implements and Tools for agricultural and other purposes.

Costumes from different countries ; also head and foot gear, fans, combs, etc.

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Coins, Medals, and Seals.

Egyptian Antiquities.—Mummies, canopic jars, funereal chests and tablets, ushabti figures, head-rests, sun-dried bricks, gods in bronze and porcelain, amulets, necklets, charms, models of boats, boxes, etc., Coptic embroidery (300-700 A.D.).

Natural History Collection.—Divided into the following:—

1. ZOOLOGY.—Mammals, birds and birds' eggs, reptiles, fishes, shells, insects, crustacea, corals and sponges.
2. GEOLOGY.—According to sequence of formations.
3. MINERALOGY.
4. BOTANY.

Special Insect Room, with cabinets of specimens, intended for those wishing to study the subject more thoroughly, including a good reference collection of British butterflies and moths.

Miscellaneous.—A few things which do not come under any of the other headings, such as—

Collection of old constables' batons or staffs of office.
„ walking sticks.
„ theatre bills, maps, tallies, etc.

Library.—The books, etc., in the library are divided under the following heads:—

1. Biblical,	686
2. Natural History,	1887
3. Travels and Ethnography,	733
4. Art and Archæology,	180
5. Proceedings of Learned Societies,	271
6. Miscellaneous or General,	1600
Total,	5357

The Staff consists of curator and secretary, naturalist, librarian, chief attendant, gardener, and caretaker.

The PRESIDENT pointed out that Sir William Flower had always deprecated the use of tall wall-cases, and had purposely abandoned the upper parts of several of the new cases built in the zoological galleries of the natural history museum.

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Mr. MARTIN expressed his great pleasure at hearing of the work being done at Forest Hill. He asked if specimens of stamped leather, repoussé work, or textile fabrics were exhibited?

Mr. PLATNAUER expressed fear lest the treatment of the section devoted to religious objects should offend some visitors. He also asked if it was proposed to utilise the tower for meteorological observations?

Mr. QUICK, in reply, said that their scheme was not yet complete, and that other classes of exhibits might yet be included. The tower was to serve the purpose of a clock tower, and would also contain a tank of water for use in case of fire. There were means provided for getting on to the top of the tower, so that it could, if advisable, be used for meteorological purposes, though no scheme for so using it had as yet been proposed.

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A RAMBLING DISSERTATION ON MUSEUMS BY A MUSEUM RAMBLER.

By Dr. J. A. MANTON.

I HAVE been told that the paper most acceptable to this Association is the one that evokes the maximum of discussion. This little essay, despite its jesting title, is written in the most serious earnest, and at its conclusion, figuratively speaking, I shall put up a metaphorical umbrella to protect myself as best I can from the shower of many-sided criticism which I know full well will pelt upon me. Joking apart, I shall consider myself amply rewarded for any slight trouble this bantering little screed may have cost me, if I am the happy means of inducing some of you to climb down from the misty heights on which you have ensconced yourself to the work-a-day world—to the level, in fact, of that much-discussed individual, "The man in the street."*

"The man in the street!" What a world of meaning there is in the much-hackneyed phrase which, so to speak, constitutes the text of my little homily, for of a surety, gentlemen, I am preaching *at* some of you. "The man in the street!" Who is he? What is he? What becomes of him?—These are a few of the queries that leap unbidden to one's lips. "The man in the street" is the most awful reality of to-day—for is he not

* The draggled tramp, seeking warmth and shelter, the betting loafer, and the out-at-elbows wastrel are not included under this title.

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already our voting machine? He, worse luck, makes our law-givers, and taken generally, he is a human factor full of enormous capabilities for good or evil. Fortunately, he doesn't realise his own power, and it is your business and my business to try and tame him before he does so; and it is our bounden duty, both as an Association and as individuals, to try and somewhat mould his destiny whilst his mind is as yet plastic—to put him in the paths of clean-mindedness and culture, and to see that he is a help and not a hindrance to the community.

As one who from boyhood has had to fight—simply to fight—for his bread and butter, and who, even now, has to work pretty strenuously for what little cheese adorns it, I frankly own that my heart goes out to that long-suffering, curiously puzzlesome, contradictory creature, "the man in the street." Like old Abe's fabled mule, it is unwise to approach him from the rear. He likes to see what you're up to. Help him, he *may* help you, but at times he has an awkward knack of biting the hand that gives. I, alas! know him well, for do I not get my living out of him? Leave him alone and he will probably drift into loafing and criminality. Poor "man in the street," hungering for he knows not what, ofttimes looking for the bread of better things, too often, far too often, getting a stone. From what sources does the street urchin, the boy who has passed his standards but who is compelled to work for his living, get the balance of his education? Why, from the conversation, good or bad, of his elders, his shop-mates, and his companions; from the hoardings, from the shop windows, from the newspapers, from the museum and art gallery, and, in a few cases, the night school. We, good folk of the Museums Association, are a nice, select little coterie; we

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discuss all sorts of high-minded things, we pat one another on the back, we have all sorts of nice little tea-fights, pic-nics, and dinner parties, but for all that I am afraid, sadly afraid, that our libraries, museums, and art galleries only partially fulfil the noble mission entrusted to them. I have an uneasy feeling that there is something wrong somewhere, and if you will allow me the privilege of being reminiscent awhile—a privilege, by the way, as Crockett puts it, "generally accorded to men in their dotage"—I will relate the evolution of experience that converted me from a knockabout Philistine to a museum-lover and a wisher for better things. As an excuse for apparent egotism, I will quote a few lines which appeared some time ago in *Chambers's Journal*, which have profoundly influenced my outlook with regard to matters psychical, literary, and artistic. The article in which the paragraph appeared was entitled "Autobiography," and the words which engraved themselves into my memory read somewhat as follows:—

> Every man has within himself, in his own mental and spiritual history, the material for a book of supreme importance. If such a man could and would write a faithful record of all he had thought and felt and experienced, he would produce a volume of unique interest and value.

This is all very well in its way, but we already have far too much of mental analysis and morbid self-introspection. "Madness" indeed "that way lies." For a few brief moments, however, I will essay a humbler task and chronicle small beer in telling you some of my youthful yearnings and disappointments, and doubtless what applies to me applies with equal force to thousands of others. Know, then, good listener, that I was born in a quaint, old-fashioned town in West Yorkshire; my nursery windows looked out on to Saxon watchfields, ruined castles, and bygone battlefields, the very streets

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told a tale of miracle-plays, tournaments, and jousts; and dear, indeed, to me is the old cathedral wherein as man and boy I worshipped, and at whose aged font not only I but my children also were christened. The love of old things, ay, and the love of the beautiful too, crept into the very marrow of my bones; but there was no one to help me. I was a veritable "man in the street." In fact my kindred regarded my mooning habits and my prowling round antique remains with something like alarm, and on my becoming bitten with the collecting mania one of my relatives exclaimed, more in sorrow than in anger—"Jack, my dear boy, whatever you do, don't become an old fossil."

Stay a moment, though; I said that there was no one to help me. There was——. In the old city there was a good School of Arts and Mechanics' Institute of the very best type, the bantling of a few scientific enthusiasts and antiquarians, and my impulses were greatly quickened by the many delightful lectures that were delivered within its walls. I have since lectured there myself over and over again, and I always feel a thrill of joy and pride when I tread those well-worn boards, hallowed by many an old association and full many a famous name. Leeds five-and-twenty years ago was badly off for museums; in Commercial Street there was a proprietary establishment wherein were displayed some rubbishy curios, badly-stuffed pythons, and some lop-sided, moth-eaten lions and tigers. The collection of the literary and philosophical associations wasn't much better, and they gloried in a bit of the mammoth's hair and some of Frank Buckland's trophies. Things, however, have vastly improved since those days. Pomfret, too, I remember, had a quaint little collection carefully looked after.

Time rolled on, and the class-room was exchanged for

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the dissecting table; but the old habits still clung, and my Saturdays were religiously spent in the vast institutions at Bloomsbury and Kensington. Looking through the mist of years, it is difficult to define one's impressions and recollections; but at any rate, my self-reliance became so pronounced that I often acted as a sort of self-constituted guide to sundry friends and country cousins. My medical studies compelled an intimate acquaintance with the marvellous collection painstakingly built up by John Hunter, and with the splendid museums of St. Bartholomew's, University College, and Guy's Hospital. At length, one fine summer evening, after the consumption of the historic tea and muffins at Surgeons' Hall, a canful of diplomas was placed in my hand and I was informed that I might go on my way rejoicing. Then began the real business of life. 'Twas a grim struggle, and, like Thackeray's Phillip, I often wondered where my next half-sovereign was to come from. But even in those hard-up days the jester's bells occasionally rang to a golden tune. An unexpected £10 note from a kindly journalist sent me packing off to quaint, old-world Holland. This happy experience, I think, was the turning point of my artistic life. I saw history enshrined in stone. I saw the tall houses, under whose long shadows Rembrandt's ghost still walks. I saw museum walls literally mosaicked by the gem-like works of the famous artists who sprang up in the blaze of genius that coruscated round that wonderful fifteenth century. I saw Rembrandt's "Anatomy Lesson"; I saw the mis-named "Night Watch"; I saw Vander Helst's arquebusiers, and felt indeed that I was just beginning to live. Providence has smiled on me somewhat since those hard, tussling days. Since then I have visited a very fair proportion of Europe's most famous collections, and

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my experiences will serve as the basis of a few generalisations.

> Tho' I've tripped and travelled the whole world over,
> From Finisterre's capes to the Downs of Dover,

yet I don't think any of my journeyings have given me a tithe of the joy afforded by that first happy-go-lucky visit to the Netherlands.

In regard to art and the people, I am sadly convinced that there is something wanting in our methods of bringing art influences to bear on the masses. By virtue of their beauty alone, pictures and statues exert a refining influence, sculpture, above everything else, teaching to humanity humanity's dignity. Some pictures it would be meddlesome and impertinent to attempt to explain; but pictures, unfortunately, don't always tell their own story. The ordinary unsophisticated, uncultured individual with his "I like that" is prone to be attracted by pictures of domesticity that he can easily understand—the vulgar "Kiss Mamma" pictures of the artist, the merely vigorous, and by the tawdry and meretricious. In fact he is like the untutored Kaffir who prefers the foulest "Cape smoke" to the daintiest vintages that ever tickled a cultivated palate. Ladies and gentlemen, you might as well expect a baby in arms to solve an equation as expect a mere child of Nature, dumped down in an art gallery, to understand and appreciate the art by which he is surrounded. I almost hear the cynical whisper, "Well, Mr. Wiseacre, what is your remedy for this unfortunate state of affairs?" I give it you in a few words. Personal enthusiastic teaching, dexterous labelling, and a cheap, popularly-written catalogue. There are many difficulties in the way—as a teacher, I am only too painfully aware of them—but they are not insuperable. "Eye-gate" and "Ear-gate" are twin approaches to human intellect. "If a few are gathered together," an astute

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curator can easily point a moral and adorn a tale. If the numbers are unwieldy, there is always photography and the lime-light lantern to help you. One of the false effects of modern culture is that, as far as social ethics are concerned, people (art teachers and museum curators not excluded) are so painfully afraid of being natural, and also are so painfully aware of their superiority to the unfortunate folks who are obliged to accept their oracularities. Things nowadays tend so much to wordiness and artificiality. Now, when you are describing a picture to a willing student, ignorant even of the very essentials of art, and ofttimes of history too, why should you mind your phrases? If, in your picture, the artist has depicted a villain's treacherous smile, say so in your catalogue or what-not. If the beauty of the picture under description lies in its accurate realisation of some point of antiquarianism or history, for goodness sake say so; don't beat about the bush, and don't leave the poor wretched "man in the street" to go on groping out misinterpretations for himself. In Manchester at any rate they seem to have grasped this most essential principle. Classical and mythological subjects are intensely puzzling to the unlettered; such titles as Actæon, Daphne, Chloris, etc., convey no meaning whatsoever to thousands of sight-seers. I selected three of the most striking pictures in the Mosley Street Art Gallery, and, acting on the Sheffield-born aphorism which says, "Put yourself in his place," I tried to think the thoughts of, say, an artisan visitor. Etty's grand work "Ulysses and the Syrens" looks for all the world like a number of rowdy artists' models out for a sea-side holiday; but if you tell your simple friends the story of the syrens' song, the meaning of the accumulated bones, and the strategy of the ear-stopping episode, the glowing canvas begins to have a meaning independent of the sensuous beauties of colour and line. Again, look at Arthur

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Hacker's "Syrinx"—you, my friends, if you didn't know the story, would see, as Hans Breitman would put it, an ethereal-looking lady "mid nodings on"; explain the beautiful old legend and the picture lives. Finally, glance at Waterhouse's picture of "Hylas and the Nymphs"; it looks as if Hylas were about to participate in a particularly well-authenticated case of mixed bathing, whereas the story simply represents the sad fate of a youth who, having forgotten his patent mythological bees-wax draught excluders, succumbed to the dulcet wooing of the nymph-sung song, and was peacefully disposed of without the trouble of a "crowner's quest." Here in my hand I hold Mr. Stansfield's delightful book sold at a penny—the best little epitome of popular art I have come across for many a long day. People won't spend a penny, I'm told. In such a case, concentrate your information and place it on a tablet so arranged as not to mar the beauty of the picture by too fussy insistency.

Much of what I have said applies with equal force to free libraries and museums, which nowadays are no longer luxuries but essentials of a wisely democratic social system. Turning more particularly to museums, what is the function of a well-equipped, well-labelled museum? (You all know, ladies and gentlemen, how much depends on that word "well-labelled.") The function of such a museum is to attract, to stimulate curiosity—the root of all knowledge—and then to teach. Take geology, for instance. A visitor is attracted by an exhibit which catches his attention. He reads a tactfully written label. Curiosity and interest are aroused. He follows the matter up, and in a judiciously-arranged institution he can build up a bold, rough framework of useful knowledge, and if his thirst for knowledge be sincere, he will soon find the means of extending his information. Where can you find such a museum? Why, at Whitechapel, under

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the care of a lady, who, I regret, is not here to-day, is a dainty little institution, a veritable object-lesson to curators and others as showing what can be done with a few modest exhibits and a good deal of tact and enthusiasm. Many of the subjects I have touched upon present grave difficulties, and my comments are not intended to apply to large national collections—rather to smaller provincial institutions. I honestly think the "earnest student" receives a little too much attention, and his unsophisticated brother too little. A few days ago a young fellow of my acquaintance was anxious to learn something about the nautilus. I suggested a visit to the local museum (not Sheffield, by the way). We inspected the mollusca cases. There was no nautilus, but a drawing of one, and attached thereto was the following information:—"The nautilus belongs to the cephalopoda or cuttle-fish family, which is divided into the tetra-branchiata and di-branchiata. The di-branchiata are again divided into the octopoda and the decapoda." Such a label is useless. If it be necessary, let us have two labels, one for the "earnest student," whereon, to use a homely vulgarism, a curator can "spread" himself and display his wisdom to his heart's content, and another for those persons who like their items of knowledge presented in a more palatable form.

I come from Sheffield, the city of the shining steel, where hands and manners are alike at times a trifle rough, but where shrewd heads go with hearts warm with the love of one's fellow-man. One of our worthiest citizens said, with wholesome truth, "You might as well have a cartload of muck as have money and not use it." So I feel with regard to art galleries and museums, that your pictures, your treasures, your curios are simply so many odds and ends, so many old stones, so many crocks and pans, unless there is some quickening

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influence at the back of them. The museums of to-day are too much like the fabled sleeping palace of old, and I hope some bold adventurer will blow a blast that will wake them to life and usefulness. The ideal curator must have a touch of the showman in his composition; like the shopman he must cry his wares; he should be a bit of a lecturer and always a helpful cicerone. I almost fancy I hear some one quote the old proverb about "showing the horse the water but not making him drink." It is all fiddle-de-dee this talk about museums, etc., being unappreciated. I think in many cases it is the curator's own fault. The curator has rightly been called the "soul of a museum," but if the curator himself is deficient in soul, it is a poor look-out for the institution under his control. Of course I know that a curator can't be at the bidding of every Yahoo; neither do Governments nor corporations regard the answering of fool questions as part of the day's work. Make your peep show attractive and people will come fast enough. Did you ever know a lady refuse to look in a gaily-dressed bonnet shop? I never did. We can't all be showmen, we can't all be lecturers, but even to the humblest of us the Almighty has given some little talent, and if we can't all be perfect curators, we can at least do something towards making the world a bit brighter than it is. Ladies and gentlemen, the jester's jingle is almost over, but before I lay down the cap and bells, will you allow me to quote the following not inapt little Yankee rhyme, and as Captain Cuttle would say "the moral lies in the application thereof":—

Be what you can, seeing what you are,
Shine like a glow-worm if you cannot be a star.
Work like a pully if you cannot be a crane,
Be an engine-greaser if you cannot drive the train.

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The PRESIDENT said that the "man in the street" did not at present seem to be a very hopeful subject in London. He came into museums chiefly for warmth or shelter, and usually brought a good deal of dirt in with him. In libraries he did much mischief by dirtying, and even tearing, books. Very often his only object in entering a library was to learn the present state of betting. He could not, however, help earnestly wishing success to such efforts to improve the masses as here proposed by Dr. Manton, though he doubted whether guide-books would be found of much practical use as means of general instruction.

Mr. CRAKE felt that much of what the President said of the "man in the street" was true, though it should not make us relax our efforts; but he felt that in dealing with children we had ample grounds for hope. He had been greatly encouraged by the warm interest taken by young visitors to the Hastings museum in his short addresses and demonstrations, and he was convinced that our chance of success in instructing the masses lay entirely in getting hold of the children, and presenting knowledge to them in a simple and interesting form.

Mr. BATHER, adverting to Dr. Manton's desire to bring art to the "man in the street," claimed that this was not best accomplished by showing him objects of art far removed by their subject or inherent character from his daily life. Show the ordinary man a thousand-guinea sideboard, and the best he could do was to imitate it in his back parlour by Wardour Street gimcrackery. Rather teach him the value of plain, well-made, properly-proportioned furniture suitable to his own home, however humble. The crowding of pictures into ugly galleries, each in its conventional academy frame (often wholly unsuited to the composition), under conditions of lighting very different from those the picture would naturally enjoy, led to the production of the exaggerated "exhibition picture," which was little else than so many feet of canvas covered with paint by a man in search of a living. Obviously, a picture was, as a rule, painted to hang on a wall, and when there it should form part of an organised scheme of decoration. Appropriate setting was essential to every form of art. It were better to possess one small object so placed as a daily joy than to visit a gallery of masterpieces wrenched from their surroundings; better still that the home should be a work of art in itself—not full of Brummagem art for the million, but bearing on every wall, in each article of furniture, every household utensil, the imprint of its owner's mind and heart. So, too, the museum should be a house beautiful, each object in appropriate surroundings, and the

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whole forming a picture harmonious, restful, and satisfying. What curator present could point to one of his own galleries as a scene of beauty? But if it were not that, it could not bring the true value of art home to the "man in the street."

Mr. HOWARTH thought it was a mistake to define the "man in the street" as the loafer or scamp whose presence in a museum, library, or other building was generally marked by signs of deterioration. Rather was he the one who took an intelligent interest in what he heard and saw. He typified a daily increasing mass of intelligent, if not well-informed inquirers, whose desire for knowledge was extending and deepening under the influence of the ever-spreading system of elementary education, which, if not imparting any very solid groundwork of knowledge, yet had the elevating tendency of engendering aspirations to an understanding of what his senses revealed. To him a museum was, perhaps, in the first instance a curiosity, in which his interest became deepened by learning something of the objects to be there gazed upon. A simple fact about an object in the museum, when given only by means of a label, added enormously to the pleasure with which it was regarded. How to give this information was the difficulty. The curator could not act the part of showman with due regard to the proper discharge of his many duties, and even if he could, his remarks could only reach a very small number of the people who visited the museum. Descriptive labels, if not too elaborate or laboured, were the best means of giving information, and for this purpose every museum should possess a small printing press which a boy could work. There were important reasons, too, why students' collections should, as far as possible, be separate from the general public collection, and this had to a certain extent been achieved at the Sheffield public museum by means of drawers beneath the table-cases, these drawers being covered with glass lids, each drawer with a projecting piece of wood on the side, near to the back, so that they could be pulled out until this stop came in contact with the locked style in front, thus revealing all their contents, while at the same time they could not be taken right out of their frame. There is, perhaps, too great a tendency on the part of curators to regard museums as simply places for teaching science. This, doubtless, they are, but they are a great deal more. A museum now is an essential element of municipal life, just as much as highways, baths, markets, parks, pleasure grounds, and even police, and it is used, in a measure, indiscriminately by the public. It is, therefore, of first importance that it should be made attractive, understandable, and accessible. The casual visitor, just as much as the serious student, should have pleasure and profit therein;

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so that, after all, a rare scientific specimen is not always the object most useful and valuable. Few of the visitors set themselves seriously to traverse a museum in any settled order, so as to follow out its line of scientific teaching. Consequently, while orderly arrangement is essential, yet each object should tell the reason why it is there, give some point of useful information, or excite a note of admiration. The fewer objects shown the better can they be displayed and described. Nor is a large number of specimens absolutely necessary to an intelligible appreciation of any given subject, though they may be required for its full understanding. An object must have a name to know it by, and it really matters little whether this is a technical or what is called a popular one. Popular names are impossible to museum specimens, and the difficulty of technical terms, as they are called by Dr. Manton, are more fanciful than real. It is the fact and purpose of the object that has to be elucidated. Lectures undoubtedly greatly help to this end, but they do not cover all the ground. Mr. Bather's remarks are rather disappointing, probably because he has dwelt exclusively on the art side of the question, leaving untouched the science museum side, in which his knowledge and experience could have enabled him to speak with that informing logical lucidity which we generally look for from him. How to make the home beautiful is a subject that has relation with the purposes of an art gallery, but the unconscious indirect influence of the latter may aid this a great deal more than any direct attempt therein of teaching it. I think all will readily admit the great general usefulness of the suggestions made by Dr. Manton in his paper, the wide experience that has prompted them, and the closeness of his observation. And gladly many of us would carry them out, our minds being fully alive to the inestimable value that museums would have if we could develop them according to our understandings; but those who hold the purse have not all kept pace with us in realising the importance and necessity of museums, which they still regard as civic luxuries, and cannot see why one man of trained knowledge and experience should not be competent to do all the scientific and literary work of a museum, and even take charge of an art gallery and library. Larger trained staffs, more ample funds, and greatly-increased space are the principal things required to bring museums in line with the requirements of the "man in the street," which I, at any rate, regard as one of the chief purposes of a municipal museum.

Mr. QUICK remarked—With regard to the penny catalogues, we have (for the last nine years) given a small handbook guide to every visitor; but, being free, we have found that some people on leaving have thrown them into the gutter, so that in future we hope to get out.

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a rather better book for a penny or twopence, with a few illustrations, at cost price—that is, to sell without making a profit.

Mr. MULLEN considered that rate-supported museums ought to be largely supported for the "man in the street." As to Dr. Manton's suggestion that the curator ought to be the "soul" of the museum, the curators of many provincial museums have to devote so much "body" in the way of manual labour, owing to the want of trained assistance, that they have not sufficient time to devote to the writing of descriptive labels, preparing lectures, and such like work for spreading of precise knowledge about the collections under their charge.

Ald. PHILLIPS thought that instead of paying over-much attention to the "man in the street," from whom much could not be hoped, it would be better far to have regard to his children. If museums could attach themselves to the educational institutions, if curators would occasionally give short addresses in the museum to the children or visitors, he thought appreciation would be sure to follow. Want of appreciation, on the other hand, might be taken to indicate that the public mind was not quite clear what the definite aim and function of a museum was. Perhaps it was not too much to say that provincial museums and their curators were all upon their trial.

Mr. HOYLE remarked that one of the main difficulties in the discussion was that of definition. It was quite evident from the remarks of different speakers that they had quite different ideas as to who was the "man in the street" about whom the discussion took place. Assuming that he was a man without special knowledge of or interest in particular branches of art or science, it appeared to him that the key to the matter was what Dr. Manton called "the enthusiastic sympathetic interest of the curator"—whether his object was to make the museum valuable to the student or interesting to the public, the complete realisation of both these objects being difficult, if not impossible. The speaker further dwelt on the great interest attaching to personal explanations by the museum staff and the desirability of interesting children in the objects displayed.

Ald. HART (Canterbury) explained that the pictures hanging in the room were specially requested by the late Mr. Beaney to be placed in one of the rooms of the Beaney Institute. He quite agreed with the remarks of the last speaker in endeavouring to interest the young generation in museums. The sages say, "He who teaches the old may be compared to one who writes on blotting paper; he who teaches the young like one who writes on white paper." He advocated the opening of museums and public libraries on Sunday, to afford the opportunity of the family and children of the working classes to

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attend those institutions on that day, and the object of their establishment would be more properly carried out.

Mr. MARTIN remarked that if the museum curator had more time to himself instead of having to direct the whole of the museum both scientific and artistic, he could give more time to lecture upon special sections of his museum, and so assist the children of the "man in the street" in their acquisition of knowledge. Also that penny catalogues were to a great extent a success.

Mr. PATON said there need be no mystery or debate about the "man in the street." That non-existent being represents the average intelligence of a community. The charge brought against museum authorities by tbe "man in the street," and backed by Dr. Manton, is that they use technical terms and long words where simple monosyllabic expressions are sufficient. But let the "man in the street" be called into court, and, whatever be his trade, occupation, or recreation, he will be found therewith to employ an endless number of technical terms "not understanded of the people." A long word, he pointed out, is as easy, if comprehensive, as the very shortest, and brachiopoda is quite as simple as "pie" when explained. That explanation may take a hundred or a hundred thousand words; but the explanation must be made, and then the term has no mystery: it becomes simple and definite. A certain dryness, Mr. Paton maintained, is inseparable from all acquirement of useful knowledge, and he regretted to find in these days an unhealthy impatience of dry books and dry studies. Nothing, he considered, was more invigorating than a solid, hard, dry book, and little good came of snippets of knowledge decked out with romantic garnishings. The "man in the street," whose whole language reeked with technical terms, had no right to complain of technical words in science. But, indeed, Mr. Paton thought a more serious charge in quite the opposite direction could be made. The "man in the street" too often gets hold of a few scientific names, and thinking thereby he has acquired real knowledge, goes his way in satisfied ignorance.

Dr. MANTON, in his reply, stated that his notion of the "man in the street" was very different from the President's. The phrase required a little definition, and he had taken pains to safeguard his definition. Mr. Bather had expressed a weakness for pictures leaping straight on to whitewashed walls from the souls of their creators. He had a fortnight's existence amongst such pictures whilst journeying in the Balkans, and the experience was a living nightmare. He thought the idea of clipping the betting news out of

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newpapers and pinning the slips on to boards was a most excellent way of getting over the delay and annoyance caused by the monopolisation of popular newspapers by the "fraternity." He (speaking in reply to Mr. Paton) had no objection whatsoever to technical terms, for were they not the shorthand of knowledge? but surely the people who didn't know the various shorthands of art, antiquarianism, geology, or what not, were entitled to a little consideration. Mr. Paton suggested that museums, like medicine, were none the worse for being a little bit dry. He, replying in the same vein, would suggest that the dryness should not be that of nauseous physic, but of good champagne. On the whole, he saw no reason to shift his attitude, for when all was said and done their duty as curators was to make dry bones live, and if they were unequal to the task—well, the sooner they changed their occupation the better.

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THE NORWICH CASTLE MUSEUM.

By HENRY WOODWARD, LL.D., F.R.S. (President, Museums Association).

THE most salient features which, from a distance, mark the site of the ancient and picturesque city of Norwich are its cathedral spire and its still more venerable castle, the donjon keep of which forms a striking object for many miles around. Long before the Romans had set foot in Britain this spot had been selected by the Iceni for a British village, and the elevated peninsula of land, almost encircled by the rivers Yare and Wensum, had presented to these early and warlike people a favourable site for a stronghold, where, enclosed by earthworks, defended by wooden palisades, and encircled by ditches, they might well defy the incursions of neighbouring tribes as restless and as hostile as themselves.

There is no evidence of Roman masonry in the castle walls, but the neighbouring camp at Caister was doubtless maintained to overawe the district, and they may have fortified the earthworks of the British station, and even kept a part of their garrison there, for all the old Roman roads in Norfolk must have radiated from Caister or Norwich (then the *Venta Icenorum*), proving that it was a place of great military importance in Roman times.

As the earlier occupiers, the Danes and Saxons, mostly built in wood, we shall be justified in concluding that nearly the whole of the present castle* is of Norman origin.

* Except the rubble flint-work foundations, the lower course of the keep, and the bridge over the inner moat, which is the largest arch extant in this country attributed to the Saxons.

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Uffa, first king of East Anglia, built the earliest structure here, 575 A.D., but this was destroyed by Sweyn, king of Denmark, in 1003, in revenge for the massacre of the Danes in the previous year; but in 1011 the Danes themselves rebuilt the castle and city, and Norwich, for the time, became a Danish stronghold. Canute, it is stated, erected another building here about 1018, but the present castle was probably built soon after the Norman Conquest.

The following inscription is placed on the eastern face of the keep:—

"This Royal Castle, built by William Rufus, as Knyghton testifies in his Chronicles, on the site of one much more ancient, has been used as a county gaol since 1345, and was finally vested in the magistrates of Norfolk for that purpose by a royal grant confirmed by Act of Parliament in 1806.

"The ornamental work and facing of the exterior having fallen into a state of extreme decay, the same were ordered to be restored, at the expense of the county, by the Court of Quarter Sessions in April, 1834. This restoration was carried into effect, with the most careful adherence to the details of the ancient work, in Bath stone, as most resembling that of Normandy,* which had been originally used, under the superintendence of the visiting Justices, and completed in 1839.

"The battlements and corbel-table were designed from the best discovered authorities, as no portion remained of the original termination to the building.

"ANTHONY SALOIN, Esq., London, Architect.
"Mr. JAMES WATSON, of Norwich, Stonemason."

Notwithstanding this bold assertion upon the wall of the keep, on Knyghton's authority, it is very doubtful whether the building was erected by William Rufus or in his reign. Antiquaries for the most part agree that a strong fort of some kind occupied the site before the Conquest, the inner moat and arch of the bridge being

* Save that it is much inferior to Caen stone in durability and fineness of texture.—H. W.

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considered of Saxon date. It is almost certain that William the Conqueror built a strong Norman castle on the site, which stood, under the leadership of Emma de Guader, Countess of East Anglia, a three months' siege by his own troops, aided by the best artillery of the day, and could not have been destroyed by the siege, as, when it was taken, a garrison of 300 men was thrown into it. It seems most improbable, therefore, that a new castle should have been erected fifty years later by William Rufus; it would be more probable that the one built by the Conqueror was enlarged and added to, notably by the portion known as Bigod's Tower, etc.

Whether the enclosure was surrounded by three distinct trenches has been disputed; but portions of outer entrenchments have been discovered by Mr. Boardman and others, and it is interesting to notice that the innermost and deepest of these moats still remains, being planted with trees and shrubs and converted into a very pleasant public garden at the base of the circular and elevated plateau, upon the level summit of which the castle is built.

The great keep, which stands at the south-west angle of this plateau, is a massive quadrangular pile, measuring 110 feet in length from east to west, 92 feet 10 inches in breadth from north to south, and 69½ feet in height to the top of the merlons of the battlements, the walls being from 10 to 13 feet in thickness. The only apertures in these huge walls are loopholes at intervals, used for purposes of defence and also to admit light to the interior apartments; but the solid walls of the exterior were relieved by ornamentation with string courses and semi-circular arches resting on small three-quarter columns.

On the east side of the keep there is a projecting tower, called "Bigod's Tower," probably built by Hugh Bigod, third Earl of Norfolk, who succeeded his brother as high

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constable of the castle early in the twelfth century. This tower, which was an open portal to the grand entrance of the castle, is of a richer kind of architecture and in the genuine Norman style. Since 1824 it has been entirely restored, so as to exhibit its pristine aspect, which certainly differs from the rest of the keep. The beautiful arch in this tower and the galleries on the same level, giving access to the loopholes and furnished with seats for the archers, are, together with the staircases in the angles, about the most interesting portions of the building to the archæologist, as they still bear the marks of the Norman chisels.

During many succeeding reigns the castle was principally used by the sovereign for the reception of State prisoners, and was held by the king's constables, and afterwards by the sheriffs for Norfolk and Suffolk, who were expected "to keep it in repair, and competently fortified with victuals and other things necessary and convenient, least danger might threaten the king." (Ed. II., 1308.)

Notwithstanding the king's commands, the citizens of Norwich having in 1294 begun to enclose their city with walls and gates, the castle, which had up to that time been considered the defence of the city, became neglected, and in its subsequent history, from 1345, must be considered simply as that of the county gaol, and its jurisdiction vested in the sheriffs of Norfolk and Suffolk as custodians for the sovereign for the time; and so it remained for the next 500 years, save that in 1805 His Majesty King George III., having no use for the place, "freely gave this ancient and royal demesne in the county of Norfolk, to be and remain in the possession of the high sheriffs and justices of peace for the said county of Norfolk, for the administration of justice, the freedom

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of elections, and the confinement of the many prisoners."—S. Woodward.*

The plateau on which the castle stands is more than six times the area occupied by the keep itself, and on this plateau (once the inner bailey of the castle) the original county prison and shire-house were situated. These were replaced by new prison buildings in 1824-28, and the keep re-faced and restored in 1834-39. In 1887, the county prison having been removed to Mousehold, the buildings were purchased of the Government by the Corporation of the city of Norwich for the sum of £4000.

It was about this time that Mr. E. Boardman, F.R.I.B.A., the city architect, submitted a plan to the Corporation, which he had cherished for many years, by which he proposed to utilise the old prison buildings and the Norman keep on the Castle Hill, and convert the whole into a magnificent museum of science and art for the city, preserving at the same time the most ancient building, "the keep," rescuing it from further decay, and from its former degradations as a prison, and restoring it as an ancient historical monument to an honoured place among the chief public buildings in the city.

On the 19th October, 1886, at a meeting of the Town Council of Norwich, the late Mr. John Gurney then being Mayor of Norwich, proposed the conversion of the keep and prison buildings into a museum, with a view to the transfer of the collections now belonging to the Norfolk and Norwich museum. A committee, known as the Castle Museum Committee, was appointed for the purpose of raising the necessary funds, etc., and to this fund Mr. Gurney contributed £5000.

Since that date the castle and all the buildings attached

* See History of Norwich Castle, by Samuel Woodward; edited by his son, B. B. Woodward. Norwich, 1847; 4to.

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to it have been leased to fifteen trustees, namely, five for the Corporation, five for the shareholders of the Norfolk and Norwich museum, and five for the subscribers to the Castle Museum Fund. When the scheme was completed, the trustees were to make over the building and collections to the Corporation, who agreed to accept the trust, and to hold the same for the permanent scientific and educational use of the citizens of Norwich, and to maintain and preserve the said collections and utilise them for the purposes of science, literature, and art, and provide out of the Corporation funds for such purpose. The cost of the conversion of the buildings amounted to £16,489, and of the fittings to a further sum of £4640, the total cost, including purchase of the castle and furniture, being about £26,474. Of this amount, £14,389 was raised by public subscription.

The museum was completed and opened by their R.H. the Duke and Duchess of York on 23rd October, 1894.

In the first three days of the museum being open to the public 16,736 persons passed the turnstiles, and the daily and yearly interest in this excellent museum is well maintained.

NOTES ON THE GALLERIES OF THE CASTLE MUSEUM.

IN CORRIDOR No. 1 are now hung the valuable old maps, plans, and views of Norwich and Norfolk, by Kirkpatrick, Blomfield, and others, bequeathed by J. J. Colman, Esq., M.P., and presented by B. B. Woodward, Esq., F.L.S.

Room A.—Room A contains the "Lombe Collection" of British birds presented by Mrs. E. P. Clarke, exhibited in 36 large cases. There are 249 species of birds represented by 540 specimens remarkably well-preserved. The gem of the collection is the great auk or gare-fowl. There is also a fine case of bustards, all Norfolk or Suffolk birds, seven in number, the history of each being known.

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CORRIDOR 2.—Passing through corridor 2, which contains the first portion of the raptorial birds, and the collection of birds' eggs and nests,

Room B.—We arrive at the fine gallery of raptorial birds presented by the late Mr. J. H. Gurney, probably the most complete collection outside the British Museum in existence.

There is also a room fitted with cases for bird skins, and a gallery above for insects and botanical specimens.

CORRIDOR 3.—Corridor 3 contains a further part of the raptorial birds, and

Room C.—Gives access to Room C, which contains the Lombe collection of birds, the foreign shells in table-cases, and the foreign birds.

CORRIDOR 4.—In Corridor 4 are the British shells.

Next follows the picture gallery.

Room D.—The next great room is fitted up as a picture gallery, and is one of the best (for its size) to be seen in any provincial city. It is especially rich in pictures by the Norwich school—John Crome, John Berney Crome, John Sell Cotman, Joseph Stannard, Mrs. Joseph Stannard, J. C. Brewer, Alfred Stannard, A. G. Stannard, Miss E. H. Stannard, George Vincent, Jas. Stark, Rev. E. T. Daniel, Robt. Ladbrooke, Hy. Ninham. The art gallery has been lately augmented by the Walker collection of 351 oil and water colour paintings, bronzes, porcelain, and enamel, and that of the late Mr. J. J. Colman, M.P., valued at £5000. The gallery will shortly be enlarged.

CORRIDOR 5.—Corridor 5 contains the continuation of the general collection of foreign shells and fishes.

Room E.—Room E contains the reptilia, mammalia, and the general collection of foreign shells.

CORRIDOR 6.—Corridor 6 contains the skeletons of mammalia, etc.

Room F.—Room F contains the geological collection. A gallery has been added to the geological section entailing the entire re-arrangement of this fine room. The geological collections are principally those formed by the late Mr. S. Woodward, Miss Anna Gurney, Mr. J. Gunn, Mr.

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J. J. Colman, Mr. C. B. Rose, and Mr. Searles Wood; forest bed series, Dogger bank, crag, chalk, etc., illustrating the geology of Norfolk.

A large number of the specimens have been used for illustration by Sir R. Owen, Chas. Darwin, Professor Boyd Dawkins, Dr. T. Davidson, Rev. J. Gunn, Mr. Searles Wood, and Mr. E. T. Newton, F.R.S., and others.

On the ground floor are the mammalia from the forest bed and pleistocene deposits. These remains occupy the whole of the wall-cases on both sides of the room.

The new gallery contains the general collection of fossils arranged stratigraphically from the newer formations to the older.

The mammalian remains follow on after the recent skeletons in the corridor leading into this room.

There are 20 wall-cases on each floor, and 6 large table-cases in the centre of room. The centre table-cases contain the collections of minerals and rocks.

THE WORK-ROOM, which has a gallery, contains the entomological and botanical collections. The lower floor is fitted with well-made cabinets with glazed drawers containing the unmounted bird skins.

THE KEEP.—Four cases on the floor contain the Walker collection of Oriental and English porcelain and pottery, Japanese and other bronzes.

THE "FITCH ROOM."—Mr. Fitch gave £500 for the fitting up of this room for the exhibition of his collection, which comprises antiquities of local and general interest, and a fine series of stone implements and bronzes.

The removal of the collections from the old museum to the Castle, and the fitting up and arrangement of the present galleries, the keep, and exhibition of pictures have been carried out entirely by Mr. James Reeve, who for so many years has ably filled the office of curator to this fine museum.

I am indebted to him for most of the facts and information given in this brief notice.—H. W.

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A NATIONAL REPOSITORY FOR SCIENCE AND ART.

By W. M. Flinders Petrie, M.A., D.C.L., etc.

IT is needless to enlarge here, before a company of curators, on the necessity of a far greater space than has yet been provided for the enormous mass of remains of man which it is our duty to preserve. The idea that nothing should be kept for the future that is worth less than £10 a square foot—the cost of the British Museum—is clearly absurd. Yet no step has yet been taken for the regular conservation of all the vast quantity of ethnological material and historical discoveries that are year by year being thrown away, or going to other countries, for lack of proper housing.

After considerable discussion, at the British Association and elsewhere, the scheme which seems most feasible is to acquire about a square mile of land within an hour of London, and to begin to build large galleries uniformly, on what may be called a gridiron plan. (Fig. No. 1.) The galleries should be placed far apart, to allow of free expansion laterally at any point, so as to incorporate future additions. (Fig. No. 2.) The proposed galleries would be about 54 feet wide and 400 feet apart, so that after completion there would be room yet for six times as much more on the intermediate ground. One of the first conditions for economical working would be to provide space some years in advance, so that nothing would be crowded, and nothing would

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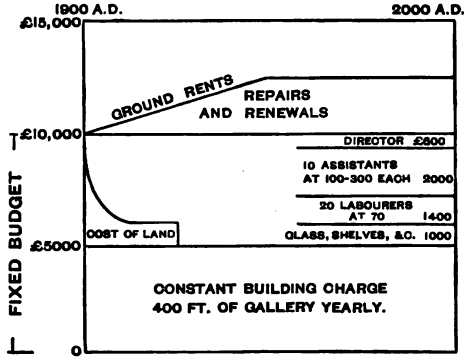
need shifting to make room for new acquisitions. The whole gridiron plan that was proposed would consist of about 400 feet of gallery per year, or about eight miles in the century, leaving six times the space to be covered by irregular additions as required. The finance of the matter, for land, building, and staff, might be met by a fixed charge of £10,000 per year. This would imply that each man employed would daily have to arrange between 1 and 2 square feet of new material. I name these outlines to give a general idea of the scale and the practicability of the proposals; but the subjects which I wish to lay before this meeting are more those of the working details.



No. 3.

For preserving great quantities of objects of small individual value, very different plans are required to those of ordinary museums. For a place with few visitors in proportion to its area, rapid ventilation is not wanted, and hence all the air could be filtered, and practically no dust admitted. Also, being in the country, and the surrounding ground wooded, very little dirt could be carried by the air in any case. Dust need not, then, be considered inside the building, and only loose sheets of glass, to prevent

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handling of specimens, would be required. Excellent lock-up cases can be made at 3s. a cubic foot for more important objects. As nothing of much value would be kept in such a place, no protection against serious theft need be considered. The whole building would be on the ground floor and unburnable, with cement floors and iron, slate and glass roof. The shelving should be of stone and slate as much as could be, and the woodwork should never be continuous—thus fire would not have to be provided against.

For the registration of all acquisitions, it is proposed to have a photographic room, with glass tables to lay them on, and an overhead vertical camera to work on two fixed scales, say, $\frac{1}{10}$ and $\frac{1}{2}$. The light should be regulated by shutters on all sides; no focussing would be needed for ordinarily flat objects, working with a small stop. The labels, with subject, origin, and date, should be placed beside each object in the group and photographed with it. Thus a complete register of portable objects would be kept very cheaply and rapidly by mere artisan labour, and the sale of photographs would probably cover the cost.

For the matter of drying the air, trays of quicklime inside all the cases would probably be effective and seldom need renewal, as the air would change very slowly. The warming for the comfort of students should rather be applied to the person than to the building, and wheel-stools, with an acetate of soda tin provided for each student in cold weather, would be far cheaper and cleaner than any general heating.

In the plan of the galleries it is proposed to have only top lighting—one quarter of the roof to be skylight, placed over the footways, so that any leakage would not reach the cases or specimens. (Fig. No. 4.)

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I shall be glad to consider any other difficulties or details that may be now proposed. As to the absolute necessity for some such great repository there can be no question, when we see what is wasted and lost every year for lack of it. And as to the finance, the mere arrest of growth of the British Museum during five years (Fig. No. 5), with weeding out of collections and library during that period into the store museum, would suffice to pay for the whole of it forever. Space we must have if the science and history of man is to grow, and not a single building in the kingdom at present is in the least adequate for even ten years of coming expansion. The details of the whole scheme of the repository have been stated in a paper issued by the Society of Arts, in the Journal for 18th May, 1900, and we have, by the courtesy of the secretary, been allowed to use the blocks from that paper.

The PRESIDENT dwelt on the great difficulties of keeping large roof-surfaces, such as those proposed, properly water-tight; he did not consider roof lighting safe. He quite admitted the wisdom of large storage and deplored the lack of it in this country, pointing out the fact that America has no apparent difficulty in housing the enormous mass of palæontological material found in her western States, nothing of which ever reached this country. He would suggest that the need be met by an extension of the British Museum over part of the ground behind it, recently purchased by the trustees. Such additions might be made quite plain, and need not be at all of an ornate character.

Mr. QUICK said—With regard to the top lighting of the museum, may I be permitted to suggest rather than a glass top light, a window at an angle? We have gone carefully into this subject in our new museum, and we have adopted a new system of inserting the glass panes, fixing them without putty but by screws and nuts, etc.

The Rev. R. A. BULLEN doubted whether land could be purchased as cheaply as suggested in the diagram of comparative prices. The proximity of a station would greatly enhance the value of land, which would more probably cost £100 to £120 an acre. The price of land

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within an hour's journey south of London, even in expectation only of a railway station, is from £100 to £150 per acre, for what is now agricultural land, and some owners will not sell even at that price.

Mr. F. A. BATHER said that this difficulty could be met by a light railway from the nearest railway station, and this would take the objects right up to the position they would ultimately occupy.

Dr. PETRIE, in reply, said—The purpose of this repository is by no means only for antiquities, but also for ethnology, and many other subjects, such as geology and palæontology, which need the preservation of large specimens and much material. Such a repository would not be intended for the general public, though it would be open to all; probably few but students would use it, and therefore we need only provide for students in the arrangements and fittings. It is good hearing that the British Museum may soon be expanded at Bloomsbury, but expansion at £10 a square foot, such as that, can never provide for the greater part of the material for study, which is not worth such housing. The site at an hour from London would not take longer to reach than South Kensington does from the East End, or Bloomsbury from Fulham; moreover, a settlement of persons interested in research would soon grow up there, and be provided for in the plans of the estate. The light railway scheme was quite intended to connect the site with an express station, and such a light line would be run through all the galleries, so as to bring in cases easily. The details of construction have been purposely avoided at this stage, but there is no practical difficulty in making a roof with skylights waterproof.

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EXHIBITION LABELS FOR BLASTOIDEA.

By F. A. BATHER, M.A., of the British Museum (Nat. Hist.).

THIS paper may be regarded as a sequel to "The Fossil Crinoidea in the British Museum," published in the Report of the Museums Association for 1891, pp. 78-110. The introduction to that paper explains for which particular section of our public such labels as these are intended. They are for the student who comes to the museum with definite inquiries, not for the casual visitor, however intelligent, still less for the idle wanderer, who would have to be bombarded with blastoids if he were to appreciate so much as their existence. The public of all museums is of a composite character, but this is peculiarly the case with a metropolitan museum, since serious students, whether of laboratory science or field natural history, form a large proportion, and one can neither reserve the museum for them, as one can a university museum, nor permit each one to range at will through the unexhibited collections. In our own case a decreasing staff finds it impossible to attend personally to the increasing number of such students. The needs of some have been provided for by the selection of a fairly typical series of fossils to form a series that can be handled by holders of students' tickets, under the eye of an attendant; but it is not easy to detach specimens of real educational value for such a purpose, since such specimens are always rare and valuable, and especially so in the case of those intermediate or

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primitive genera that make special appeal to the modern zoologist. As for the stalked echinoderms, examples are hardly to be found at all in the students' series, and it is all the more necessary that they should be adequately displayed in the public galleries.

The problem now presents itself: How are we to exhibit an advanced teaching series without frightening away the public, or, at least, without obscuring in a multiplicity of detail those broad outlines that might otherwise be made impressive? Or, from another point of view, how are we, from so superior a plane, to arrest the attention of the humble sightseer, and to give him something new and true to think about? Various solutions may be suggested. One might set apart certain galleries for serious people; but this would involve duplication of labour and material, and would, by concentration, intensify the difficulty and supposed dryness of scientific study. One might place the advanced series in glazed stop-drawers, to the great delight of street urchins, who would soon jolt into chaos the most carefully fixed arrangement; and apart from this, the plan involves more break in continuity than is desirable, or than is necessary under other schemes. If one could induce the independent Briton to view the contents of the museum in a definite order, then the dichotomous method of exhibition would be as satisfactory as any. By this I mean something of the following nature:—I. Natural objects are (*A*) organic or (*B*) inorganic; explain and illustrate the meaning of these terms. (*A*) Organic objects are of (1) animal or (2) vegetable origin; illustrate difference between animal and plant. These objects may be studied (*a*) according to their relations to man; (*b*) their activities and general relations to the world at large; (*c*) their distribution in space and time; or (*d*) their structural and genetic

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relations to each other. The last-named point of view has to be elucidated first, because only thus can a system of nomenclature be made intelligible. We proceed then with *A*, 1, *d*. Animals are divided into (i.) unicellular and (ii.) multicellular; these terms are explained with a few examples. Continuing line ii., it is pointed out that multicellular animals (or, roughly speaking, Metazoa) fall into two grades of structure—(α) Coelentera; (β) Coelomata. The difference between these is illustrated, and one may pursue the study of (α) or (β). The visitor that chooses the latter finds that Coelomata are built on several definite plans—(*a*) Echinoderma; (*b*) Mollusca; (*c*) Arthropoda; and others, ending in Vertebrata. Each of these groups is illustrated by one or two examples of well-known animals, starfish, snail, beetle, frog, and so forth, and the main differences between them explained in simple language. Each group is then treated in more detail, and one can pass to whichever one may prefer. We then choose (*a*) Echinoderma, and here find a more detailed label (see paper on Crinoidea, quoted above), with illustrative examples, and finally a statement that the animals placed in this group or "phylum" may be divided among the classes—I. Cystidea; II. Blastoidea; III. Crinoidea; IV. Edrioasteroidea; V. Holothurioidea; VI. Asteroidea (including Asteroida and Ophiurida); VII. Echinoidea. Of each class a single specimen should be exhibited, with a diagram, and a label stating the obvious and broad features that distinguish each class from the other; it may also be pointed out that classes I.-IV. differ from the rest in certain features of habit and structure, and may be termed Pelmatozoa, while classes V.-VII. are Eleutherozoa. Up to about this point, for all groups of animals and

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plants, information of the character suggested may be conveyed in a very simple manner, while the specimens needed for its concrete elucidation should be within the reach of the poorest museum, especially if its curator remembers that a good cast or model is, as a rule, better and cheaper than a rare and obscure natural object. Thus far, too, the space required is not great, and one should be able, in a central hall of moderate dimensions, to arrange these dichotomous or gradually divergent series in such a way as to lead to the more detailed exposition in the adjacent galleries. Moreover, as a large amount of the information would deal with objects pretty well known to every human being, as well as with conceptions and relations which many people look on as familiar, the series need not repel, and might even attract, the most Bank Holiday-making man in the street. But an ideal arrangement demands an ideal public, one that both lacks knowledge and seeks it in a docile spirit. Till such a public exists, all attempts to compel continuous attention by mere perfection of system are predestined failures. People will wander from the narrow way, and they will look into Bluebeard's chamber. Well, one can pick up a good deal by discursive reading: it is the true holiday way of acquiring knowledge. The practical curator will recognise this, and will scatter tit-bits of striking information among his pedantic labels. But lest these should be overlooked they must be made to attract attention. They must depart from the general rule by being printed in larger type (or smaller—some people always read footnotes), or on different paper, or in differently coloured ink. Try anything, for the British public will not read labels if it can help it. It is not necessary that such poster-labels should break the continuity of

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an educational series. They may head a whole case, or explain some large and necessarily isolated specimen. But even in a series something might be done by the use of large and small type, as in a text-book.

The preceding remarks serve to show what the labels now presented are not. They may be regarded as part of the series that would continue the dichotomous arrangement beyond the point where we dropped it. The reader of them is expected to understand the terms Animal, Metazoan, Coelomate, Echinoderm, and it is assumed that he has come to the Blastoidea after learning something about the Cystidea; but he is not supposed to know more about Blastoidea than that they are recognised as a class of Echinoderma. The descriptions of the families and genera are not put forward as strict systematic diagnoses, nor is the information intended to do away with the need for a text-book; but the labels place the observer at the right point of view, and enable him to correlate the arrangement and the specimens with the accounts accessible to him. Under each genus reference is made to the work wherein it was first described and to the last comprehensive account of it, in which latter the student will probably find the intervening literature cited. Technical terms are used partly for precision and brevity, partly because the student will have to learn them sooner or later, and he may as well have them explained at the outset; but it is essential that they should be explained. The Linnæan nomenclature is such a rock of offence to many people genuinely interested in animals and plants that it seems well to attempt some sort of answer to their perpetual question—"But why do you call it so-and-so?" The attempt would, of course, prove more successful if only the describers of new genera and species had more often put the same question to themselves. The etymo-

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logy, however, can generally, if not quite always, be given, and an interesting light thrown on the peculiar knowledge of dead languages possessed by zoologists.

There are some features in this series to which attention may be directed. The arrangement is systematic, *i.e.*, according to the zoological classification. The Blastoidea being a small and compact group, this does not involve great alteration of the general arrangement of the fossil Invertebrata in the British Museum. They are usually divided into British and Foreign, and again into Silurian, Devonian, Carboniferous, and so forth. It will, however, be found that a natural classification generally chimes in well with chronological and geographical distribution. The fact, for instance, that *Pentremites* is found in North America but not in England is quite as readily learned from the labels and distributional maps attached to the specimens of *Pentremites* as it would be from the absence of those specimens from a British series. Chronological distribution may be emphasised by marking the range of the family, genus, or species on a table of strata. The Blastoidea being all palæozoic, that fact may be shown once for all at the beginning of the series, and subsequent tables may be confined to palæozoic rocks, thus enabling more detail to be given. Again, if the systematic classification be, as we now try to make it, a true representation of affinities, it should be possible, without departing from it, to show the evolution, and thus the true homologies, of many important structures. The student who approaches the hydrospires, spiracles, and pseudambulacral plates, by the same gradual steps from simple to complex as were followed in the history of the class, will have far less difficulty in comprehending them than if he were at the outset to attack a specialised type like *Pentremites* in the way the ordinary text-book demands of him.

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One word of warning. It is not imagined that labels drawn up for the special conditions of one museum can be transported without change to another museum. But some care must be exercised in making the change. If, for example, a curator has little space or few specimens, and decides to exhibit only *Pentremites* and *Orbitremites*, or whatever else he happens to have, it will be of no use for him to take the labels for those genera as here published. Without the others they will be unintelligible. For *Pentremites* alone he must take, at all events, the main facts given in labels 1, 2, 3, 12, 13, 14, 15, 21, 23, as well as many to be found in labels 16, 17, 18, 19, 20, 22. Each label is, of course, followed by some specimen, or diagram, or model; and each of these has its special label, indicating its source and the particular points shown by it. These subsidiary labels depend to so large an extent on the material at the disposal of the individual curator, that they are here replaced by a few informal suggestions within square brackets. For figures and systematic account, the curator is supposed to have Etheridge and Carpenter's Catalogue of Blastoidea in the British Museum, 1886. An Index to genera and species, with references to literature, has also been published by the trustees of the museum. Frequent reference is also made to Lankester's Treatise on Zoology, Section III., Echinoderma, by F. A. Bather and others (A. & C. Black, 1900).

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1. **BLASTOIDEA.**

The BLASTOIDEA or "Bud-forms" (βλαστός, *a bud*) constitute a class of the Pelmatozoa, that is to say, those Echinoderma which live with the mouth upwards and convey food to the mouth in small particles by means of currents of water driven along ciliated grooves ('subvective grooves').

[Illustrate by diagram showing relative positions of Crinoid or Blastoid (*e.g.*, the reconstruction in Treatise, Echinoderma, p. 82) and a Starfish. Also section across a ciliated groove, and plan of a Cystid (*e.g.*, *Protocrinus* in Treatise, Echinoderma, p. 75) to show course of grooves.]

2. In the BLASTOIDEA the subvective grooves are 5, but one may dwindle away. They radiate from the central mouth-region over the surface of the theca (the plated case that contains the viscera), and each lies on a lancet-shaped plate. They pass first between 5 deltoid (Δ-shaped) plates; and, since the grooves mark the radii or rays, the deltoids are inter-radial. The grooves are then bordered by small, alternating side-plates, which bear thin, jointed processes, the 'brachioles' or little arms (sometimes called pinnules), to which side-branches pass from the main grooves. The grooves and the mouth-region are protected by small plates, of which those over the grooves can open outwards.

[Specimen or diagram of any ordinary Blastoid, mouth uppermost, with lines pointing to mouth, grooves, deltoids. Enlarged diagram, simplified from Eth. and Carp., Cat. B. M., pl. xiv. f. 11, and lettered to show deltoids, side-plates, and lancet-plates. Or else Roemer's figure of *Pentremites*, which is in Zittel and most text-books. There is a good drawing in Lang, but rather too detailed for present purpose.]

3. Each main subvective groove with its lancet-plate, side-plates, and covering-plates, is often called an 'ambulacrum' or 'pseudambulacrum,' from its resemblance to the ambulacral area of a sea-urchin. But there is no evidence that the subvective areas of a Blastoid possessed tube-feet of any kind.

[Ambulacrum of *Echinus* showing pores for podia. Also diagram matic sections showing different relations of water-vessels, etc.]

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4. The thecal plates, however irregular in some species, always comprise definite plates, 'basals,' at the pole opposite to the mouth, as well as a distinct plate, 'radial' at the end of each main groove. The boundaries of the thecal plates never cross the subvective areas.

[Contrast, by specimens or drawings, the regularity of a Blastoid with the want of relation between food-grooves and thecal plates exhibited in *Amygdalocystis*, *Schizocystis*, or *Lepadocystis*. See Treatise, Echinoderma, pp. 57, 61, 62, or Lovén, On Pourtalesia, p. 10.]

5. The BLASTOIDEA form a small and compact group, apparently derived, in Ordovician times, from the Cystidea Diploporita. They were most abundant during the Lower Carboniferous period, and then suddenly died out.

[Full geological scale, with range of Blastoids marked. If Cystidea Diploporita are not otherwise displayed, take a figure of *Fungocystis* or *Mesocystis*. See Treatise, Echinoderma, pp. 74, 76, or Jaekel, Stammesgeschichte d. Pelmatozoen.]

6. The genera included in the BLASTOIDEA may be divided, according to the greater or less development of certain structures, into two Grades: PROTOBLASTOIDEA and EUBLASTOIDEA.

[No illustration.]

7. **Grade: PROTOBLASTOIDEA.**

The PROTOBLASTOIDEA or "Earliest Blastoids" (πρῶτος, *first*), are distinguished from the Cystidea Diploporita by little else than the more regular arrangement of thecal plates; and from the remaining Eublastoidea by the absence of 'hydrospire-folds' (see under Eublastoidea). The Protoblastoidea occur in Ordovician rocks and form a link between Cystidea and Eublastoidea.

[A geological scale may be given, but is hardly necessary.]

8 **ASTEROBLASTIDAE.**

In ASTEROBLASTIDAE the thecal plates are indefinite in number, and are pierced by diplopores (as in Cystidea Diploporita); a special plate with many such pores adjoins the deltoid in each interradial area.

[If not elsewhere shown, the structure of a diplopore might be elucidated by drawing. See Treatise, Echinoderma, p. 42, figs. 5, 6.]

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9. **ASTEROBLASTUS, Eichwald.**

(Etym., ἀστήρ, *a star*, denoting resemblance to Star-fish.)

Basals, 4; Radials, 5. Between them are 25-50 polygonal plates. The pore-plate adjoining the deltoid is large, with a median crest, and is almost separated by the pseudambulacra from the other plates of the interradius.

Eichwald: Bull. Soc. geol. France (2) xix, p. 62; 1862.
F. Schmidt: Mem. Acad. Sci. St-Petersbourg (7) xxi. No. 11, p. 29; 1874.
Jaekel: Stammesgeschichte d. Pelmatozoen, I. p. 383; 1899.

[Specimens of this being unattainable, select drawings from Schmidt and Jaekel, or from Treatise, Echinoderma, p. 79.]

10. **BLASTOIDOCRINIDAE.**

In BLASTOIDOCRINIDAE the thecal plates are definite in number, and bear no diplopores; there is no distinct pore-plate.

11. **BLASTOIDOCRINUS, Billings.**

(Etym., *Blastoides* and *crinus*, denoting a Stalked Echinoderm that resembles a Blastoid.)

Basals at least 3, pushed inwards. Radials 5, not notched for reception of pseudambulacra. The deltoids are large, and their lower halves, which correspond to the pore-plates of *Asteroblastus*, are striated and have folded edges, differing from the hydrospires of *Codaster* only in the less degree of folding.

E. Billings: Canad. Organic Remains, dec. iv, p. 18; 1859.
F. Schmidt: Mem. Acad. Sci. St-Petersbourg (7) xxi, No. 11, p. 29; 1874.

[In the absence of specimens, take the diagrammatic reconstructions of Treatise, Echinoderma, p. 81. A map will show distribution in Russia and Canada.]

12. **Grade: EUBLASTOIDEA.**

The EUBLASTOIDEA or "Blastoids proper" (εὖ, *well*) are the forms to which the name Blastoidea is usually restricted. In them the thecal plates have assumed a definite number and position in three circlets, namely, 3 Basals, 5 Radials, and 5 Deltoids.

[Give analysis of a theca, *e.g.*, Treatise, Echinoderma, p. 83, f. 3, or a radially arranged one. Also a specimen, and in both colour basals *blue*, radials *red*, and deltoids *brown*, the anal deltoid *greenish-brown*.]

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13. The substance of the radials and deltoids is thrown into deep folds, which cross the sutures between those plates and lie parallel to each of the five subvective grooves; these folds hang down into the thecal cavity, and thus bring the sea-water close to the fluid of the cavity; hence the structures are called 'hydrospires' (ὕδωρ, *water*, and *spiro*, I breathe).

[If possible, construct a model of the hydrospires in one interradius of *Codaster*, basing it on Treatise, Echinoderma, p. 83, ff. 1, 6; and Eth. and Carp. Catalogue, pl. xviii. f. 6.]

14. The EUBLASTOIDEA range from Silurian to Carboniferous times. Among their earliest and simplest representatives are the genera CODASTER, TROOSTOCRINUS, and NUCLEOCRINUS These appear to have given rise to three distinct Series or lines of descent.

[Geological scale.]

[One might introduce fig. on p. 92 of Treatise, Echinoderma.]

15. ## Series: CODONOBLASTIDA.

The CODONOBLASTIDA, though varying much in form, may be described as bell-shaped. Their pseudambulacral areas generally are wide, and the hydrospire-folds relatively numerous.

16. ## CODASTERIDAE.

In CODASTERIDAE the hydrospires are simple folds in the substance of deltoids and radials, and appear as such on the upper surface. They are simplest in *Codaster*, but gradually become more compressed and overlapped by the side-plates of the pseudambulacra in *Phaenoschisma*, *Cryptoschisma*, and *Orophocrinus*.

17. ## CODASTER, M'Coy.

(Etym., κώδων, *a bell*, and ἀστήρ, *star*.)

The hydrospire-folds are not hidden by the pseudambulacral structures, but are clearly seen in each interradius, except the posterior, where they are very slightly developed. The side-plates, which lie along the sides of the lancet-plates, are not simple as in Protoblastoidea

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but each is divided by a diagonal suture into an inner and outer portion of triangular outline.

M'Coy: Ann. Mag. Nat. Hist. (2) iii, p. 250; 1849.
Etheridge and Carpenter: Cat. Blastoidea Brit. Mus., p. 259; 1886.
Bather: Lankester's Zoology, iii, p. 82; 1900.

[Here, as under each genus, will naturally follow such specimens as the museum may possess suitable for exhibition. But it will be in all cases necessary to add diagrams selected from the literature referred to. A time-scale of Palæozoic rocks and a map for distribution should also be shown.]

18. PHÆNOSCHISMA, E. & C.

(Etym., φαίνω, *to make visible*, and σχίσμα, a *slit*.)

The hydrospire-folds or slits are, as the name implies, still visible to some extent; but they are more concentrated than in *Codaster*, and are largely overgrown by the side-plates and lancet-plates. The outer portions of the side-plates are smaller than in *Codaster*, and are pushed outwards, so as to form distinct 'outer side-plates.'

Etheridge and Carpenter: Ann. Mag. Nat. Hist. (5) ix, p. 226; 1882.
Etheridge and Carpenter: Cat. Blastoidea Brit. Mus., p. 171; 1886.

[Also Treatise, Echinoderma, p. 85, several suitable figures.]

19. CRYPTOSCHISMA, E. & C.

(Etym., κρυπτός, *hidden*, and σχίσμα, a *slit*.)

The hydrospire-slits are, as the name implies, entirely hidden by the pseudambulacral structures. The outgrowth of the side-plates shuts off a space above the folds as a 'hydrospire-canal'; this passes to the exterior at the end nearest the mouth by an opening ('spiracle') between the side-plates and the adjacent deltoid.

Etheridge and Carpenter: Cat. Blastoidea Brit. Mus,. p. 280; 1886.

[Also Treatise, Echinoderma, p. 85. A series showing origin of spiracles may well be introduced here.]

20. OROPHOCRINUS, v. Seebach.

(Etym., ὄροφος, a *roof*, and *crinus*.)

The name alludes to the small plates roofing over the mouth, which, however, existed in all Blastoids. The hydrospire-folds are more concentrated than in other members of the family; but their slits are not so much

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hidden as in *Cryptoschisma* owing to the less width of the pseudambulacral structures. For the same reason there are no definite spiracles, but the hydrospire-canals pass to the exterior by clefts between the side-plates and the deltoids. The hydrospire-folds are so squeezed beneath the lancet-plate that the walls of those nearest the radial line meet and form a 'sub-lancet' plate.

K. v. Seebach: Nachr. Ges. Wiss. Gottingen, 1864, p. 110.
Etheridge and Carpenter: Cat. Blastoidea Brit. Mus., p. 283; 1886.

[Refer back to the figure illustrating label 1, if used; if not, introduce the figure here. Diagrams should pay special attention to covering-plates of tegmen, and to sub-lancet.]

21. **PENTREMITIDAE.**

In PENTREMITIDAE the hydrospire-folds are concentrated beneath the side-plates and open into a common canal on each side of the pseudambulacrum. This hydrospire-canal runs under the side-plates towards the mouth and there emerges in slits or holes called 'spiracles.' The spiracles are bounded by deltoids and side-plates.

[For evolution of spiracles refer to label 19. Diagram should direct attention to the hydrospire-canal.

22. **PENTREMITIDEA, D'Orb., em. E. & C.**

(Etym., *Pentremites*, generic name, and ἰδέα, *form.*)

The theca varies much in shape, but the basals always form a high, slender cup. The deltoids are overgrown by the radials, so that only their crests are exposed. The pseudambulacra are narrow and the side-plates often lie over the lancet-plate.

A. d'Orbigny: Prodrome Paleont. Strat. i, p. 102; 1849.
Etheridge and Carpenter: Cat. Blastoidea Brit. Mus. p. 169; 1886.
Oehlert: Bull. Soc. geol. France (3) xxiv, p. 829; 1897.

[A good generalised diagram is given by Oehlert, *loc. cit.*]

23. **PENTREMITES, Say, em. E. & C.**

(Etym., πέντε, *five*, and τρῆμα, a *hole.*)

The name alludes to the five holes around the mouth-opening, which are conspicuous in the type-species, *P. Godoni;* these are the spiracles, which in that

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species are single, while the posterior spiracle, as in all Pentremitidae, includes the anal opening. The genus differs from *Pentremitidea* in the less height of the basals, the greater exposure of the deltoids, the broader, petal-shaped pseudambulacra, and the position of the side-plates alongside of the lancet-plate and not over it; but many species of *Pentremitidea* approach *Pentremites* in one or other of these points. A sub-lancet is developed, as in *Orophocrinus*, and this has not been observed in *Pentremitidea*.

Say: Amer. Journ. Sci. ii, p. 36; 1820.
C. F. Roemer: Archiv Naturgeschichte, xvii (1), p. 353; 1851.
Etheridge and Carpenter: Cat. Blastoidea Brit. Mus., p. 150; 1886.

[Specimens and figures of this abound. Many of the latter should be used with caution. For pseudambulacra, see Treatise, Echinoderma, p. 85, ff. 3, 4.]

24. Series: TROOSTOBLASTIDA.

The TROOSTOBLASTIDA are elongated in form, with linear pseudambulacra, and a moderate number of hydrospire-folds, which are but slightly concentrated.

[Refer to label 14.]

25. TROOSTOCRINIDAE.

The TROOSTOCRINIDAE (Troostoblastidae, Etheridge and Carpenter) are symmetrical in shape but often have a three-sided base. The hydrospire-canal communicates with the exterior by 'pores' between the side-plates, and by spiracles. The spiracles are bounded by the deltoids and lancet-plates. The deltoids and the area round the mouth are relatively small.

26. TROOSTOCRINUS, Shum., em. E. & C.

(Etym., *Troost*, name of an American geologist, and *crinus*.)

Four of the deltoids are restricted to the very small truncate summit of the theca; but the posterior deltoid is much larger, and at its oral end is the posterior spiracle, through which the anus opens. The walls of the hydrospire-folds supporting the lancet-plate are thickened, and tend to form 'hydrospire-plates' covering the immediately adjacent folds. The base is

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elongated, with section rounded above but triangular below.

Shumard: Trans. Acad. Sci. St. Louis, ii, p. 384; 1866.
Etheridge and Carpenter: Cat. Blastoidea Brit. Mus., p. 191; 1886.
Bather: Lankester's Zoology, iii, p. 86; 1900.

[Specimens rare. Diagrams should show hydrospires, hydrospire-plate, and triangular base.]

27. **METABLASTUS, E. & C.**

(Etym., μετά, *after*, and *blastus*.)

The name implies that this is a blastoid coming after *Troostocrinus* in both time and structure. It differs from that genus in the small size of the posterior deltoid, and in the distinctness of the posterior spiracles from the anal opening. The hydrospires resemble those of *Troostocrinus*. The base is elongate, and triangular in section, with flattened sides.

Etheridge and Carpenter: Cat. Blastoidea Brit. Mus., p. 196; 1886.

[Not very important to bother about this.]

28. **TRICOELOCRINUS, M. & W.**

(Etym., τρι-, *thrice*, κοῖλον, a *hollow*, and *crinus*.)

As in *Metablastus*, the deltoids are all small, and the posterior spiracles distinct from the anal opening. The distal ends of the hydrospires are enclosed within the thickness of the radial plates. The base is short, and hollowed out along the three interbasal sutures, whence the name.

Meek and Worthen: Proc. Acad. Nat. Sci. Philadelphia for 1868, p. 358.
Meek and Worthen: Geol. Surv. Illinois, v, p. 507; 1873.
Etheridge and Carpenter: Cat. Blastoidea Brit. Mus., p. 203; 1886.

[For good general figures see Meek and Worthen, 1873. For enclosure of hydrospires in radial see Etheridge and Carpenter. Also see Treatise, Echinoderma, p. 92, f. 2.]

29. **ELEUTHEROCRINIDAE.**

The ELEUTHEROCRINIDAE include the single genus *Eleutherocrinus*, which is asymmetrical in shape and structure, and was placed by Etheridge and Carpenter, along with other asymmetrical genera, in an Order—Irregulares.

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30. **ELEUTHEROCRINUS, Shum. & Yand.**

(Etym., ἐλεύθερος, *free*, and *crinus*.)

Four of tbe radials, with their pseudambulacra and hydrospires, are much like those of *Troostocrinus* and *Metablastus*. But at an early stage of its life-history this blastoid seems to have come free from its stem and fallen on its right posterior side. Thus that side became somewhat flattened, while the two larger basals grew along it, and its radial shortened and broadened. The pseudambulacrum borne by this radial has only seven side-plates on either side, but these are elongated transversely to the median groove and curved distalwards. The anus is believed to have opened on the right upper margin of this radial, between it and the posterior deltoid.

Shumard and Yandell: Proc. Acad. Nat. Sci. Philadelphia, viii, p. 74; 1856.
Etheridge and Carpenter: Cat. Blastoidea Brit. Mus., p. 294; 1886.
Whiteaves: Contrib. Canad. Palæont., i, p. 110; 1887.

[A reconstructed diagram is given in Treatise, Echinoderma, p. 88. Specimens exceedingly rare.]

31. **Series: GRANATOBLASTIDA.**

The GRANATOBLASTIDA are usually melon-shaped. Their pseudambulacra are linear and stretch far down the theca. The hydrospire-folds are few and much concentrated; they hang into the thecal cavity further than is the case in Codonoblastida and Troostoblastida.

[Refer to label 14.]

32. **NUCLEOCRINIDAE.**

The NUCLEOCRINIDAE (Nucleoblastidae, Etheridge and Carpenter, in part) have an ovoid theca, which is symmetrical except for the presence of a large anal inter-radial in *Nucleocrinus*. The deltoids are large, with traces of a compound origin. The plates that cover the mouth are firmly united into a tegmen.

33. **NUCLEOCRINUS, Conrad.**

(Etym., *Nucleus*, a *kernel*, and *crinus*.)

This name, as well as the synonyms *Elaeacrinus*, Roemer and *Olivanites*, Troost, describes the shape

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of the theca. The basals and radials reach a very short way up it, and the greater part of each pseudambulacrum lies between certain interradial plates. The posterior interradius contains three such plates: a median and two laterals. The anal opening lies at the oral end of the median plate, and is enclosed by the laterals, which meet above it and separate it from the spiracles. The median plate is smooth, with a vertical ridge; the laterals are marked by transverse grooves, each leading to a pore. The other interradial areas are ornamented in like manner, but the median and lateral portions are not separated by sutures. These interradial plates are regarded as deltoids by some writers, but possibly only their upper portions correspond to the deltoids of other Eublastoids. The hydrospire-folds are two, and hang from a long hydrospire-canal.

Conrad: Journ. Acad. Nat. Sci. Philadelphia, viii, p. 280; 1842.
C. F. Roemer: Archiv Naturgeschichte, xvii (i), p. 375; 1851.
Lyon: Rep. Geol. Surv. Kentucky, iii, p. 492; 1857.
Etheridge and Carpenter: Cat. Blastoidea Brit. Mus., p. 210; 1886.
Bather: Lankester's Zoology, iii, p. 88; 1900.

[The genus is particularly interesting, and specimens are to be purchased.]

34. SCHIZOBLASTUS, E. & C.

(Etym., σχίζω, *I split*, and *blastus*.)

This differs from *Nucleocrinus* chiefly in the absence of a median plate from the anal interradius. The single plate (deltoid) occuring in each interradius preserves the peculiar ornament noticed in *Nucleocrinus* but is usually of less relative size. There are 1-4 hydrospire-folds. The genus differs from *Orbitremites* (=*Granatocrinus*), with which it was formerly confused, in having double spiracles, appearing as linear slits between the lancet-plate and the deltoid ridges (whence the name). In most species, however, the posterior spiracles are confluent with the anal opening.

Etheridge and Carpenter: Ann. Mag. Nat. Hist. (5), ix, p. 243; 1882.
Etheridge and Carpenter: Cat. Blastoidea Brit. Mus., p. 220; 1886.

[Except as a link, and for the sake of pointing out difference from *Orbitremites*; the exhibition of this genus is not important.]

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35. **ORBITREMITIDAE.**

The ORBITREMITIDAE (Granatoblastidae, Etheridge and Carpenter, extended) have a globular, symmetrical theca, with concave or flattened base, down to which the pseudambulacra stretch. The hydrospire-folds are attached to a 'hydrospire-plate,' which runs alongside of the lancet-plate. The deltoids are rarely included in the folds of the hydrospire, but are usually pierced or grooved by the hydrospire-canals, which pass through, beside, or under them to the spiracles.

36. **ORBITREMITES, T. & T. Austin.**

(Etym., *Orbs, a globe*, and τρῆμα, *a hole*)

As in *Pentremites*, there are 5 spiracles, the posterior including the anus; but each of these passes right through the substance of the deltoid and then branches into the two hydrospire-canals, which run alongside the lancet-plate, being separated therefrom by the hydrospire-plate. In shape, proportions, and ornament, the thecal plates do not differ greatly from those of *Schizoblastus*. The globular form is alluded to in the name *Orbitremites*, as well as in the better-known synonym *Granatocrinus* (Hall).

T. and T. Austin: Ann. Mag. Nat. Hist. (1), x, p. 111; 1842.
J. Hall: Rep. New York State Cab. Nat. Hist. xv, p. 146; 1862.
Etheridge and Carpenter: Cat. Blastoidea Brit. Mus., p. 238; 1886.

[Specimens common in N. America, and not very rare in England. Attention should be directed to differences between this and *Pentremites*.]

37. **CRYPTOBLASTUS, E. & C.**

(Etym., κρυπτός, *hidden*, and *blastus*.)

The name alludes to the essential distinction between this and *Orbitremites*, viz., the passage of the hydrospire-canals *beneath* the lancet-plates, which abut directly on the deltoids, so as to open in spiracles on either side of the deltoid.

Etheridge and Carpenter: Cat. Blastoidea Brit. Mus., p. 229; 1886.

[This will need a carefully enlarged diagram, or model, if the character is to be made intelligible.]

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38. **HETEROBLASTUS, E. & C.**

(Etym., ἕτερος, *unusual*, and *blastus*.)

This differs in the structure of its spiracles from all other genera: the hydrospire-canals of each interradius pass beneath the deltoid, and then curve outwards on either side to the double spiracles, between which the deltoid projects as a stout spine. There appears, however, to be a single anal spiracle. The pseudambulacra are more petal-shaped than is usual in the family, and a hydrospire-plate has not been detected.

Etheridge and Carpenter: Cat. Blastoidea Brit. Mus., p. 225; 1886.

[The course of the hydrospire-canals is hard to show in this genus also.]

39. **MESOBLASTUS, E. & C.**

(Etym., μέσος, *intermediate*, and *blastus*.)

The genus was regarded by its founders as intermediate between *Orbitremites* and *Pentremites*, since, while the form and proportions of the thecal plates are like those of *Orbitremites*, the spiracles are bounded by deltoids and side-plates as in *Pentremites*, and are separated by a more or less prominent deltoid crest, except in the anal spiracle. The structure of the hydrospires, however, is that of Orbitremitidae.

Etheridge and Carpenter: Cat. Blastoidea Brit. Mus., p. 181; 1886.

[Diagram section of hydrospires should be given and contrasted with that of *Pentremites*.]

40. **ACENTROTREMITES, E. & C.**

(Etym., ἀ, *away from*, κέντρον, *the centre*, τρῆμα, *hole*.)

The name was probably intended to express the fact that the spiracles are further from the oral centre than in other blastoids: the hydrospire-canal opens on the suture between the radial and the deltoid, so that there are ten spiracles. The anus pierced the upper end of the posterior deltoid. The hydrospire-plates are so large as to meet beneath the lancet-plate, and thus to simulate a sub-lancet.

Etheridge and Carpenter: Ann. Mag. Nat. Hist. (5), xi, p. 232; 1883.
Etheridge and Carpenter: Cat. Blastoidea Brit. Mus., p. 234; 1886.
Bather: Lankester's Zoology, iii. p. 90; 1900.

[Exceedingly rare. For diagrams, see Eth. and Carp., 1886, and Bather.]

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41. **PENTEPHYLLIDAE.**

The PENTEPHYLLIDAE include only the asymmetrical, but still 5-lobed, *Pentephyllum*, which was placed by Etheridge and Carpenter in their Order—Irregulares.

42. **PENTEPHYLLUM, Haughton.**

(Etym., πέντε, *five*, and φύλλον, *a leaf*.)

The genus is based on a single internal cast. It is said to be unstalked. The base is symmetrically 5-lobed (whence the name); but of the pseudambulacra, one is a little shorter than the rest, while the two next curve slightly away from it. This asymmetry seems to be of the same nature as that of *Eleutherocrinus*, but less developed. The structure of the pseudambulacra and hydrospires, and the nature of the ornament are unknown; but the large deltoids and linear pseudambulacra suggest affinities with Orbitremitidae.

Haughton: Journ. Geol. Soc. Dublin, viii, p. 183; 1859.
Etheridge and Carpenter: Cat. Blastoidea, Brit. Mus., p. 296; 1886.

[A cast of the unique specimen may be purchased from Brit. Mus. Refer back to label 30.]

43. **ZYGOCRINIDAE.**

The ZYGOCRINIDAE include only the asymmetrical and 4-lobed *Zygocrinus*, which was placed by Etheridge and Carpenter in their Order—Irregulares.

44. **ZYGOCRINUS, Bronn.**

(Etym., ζυγόν, *a yoke*, and *crinus*.)

The theca is depressed, stemless, and produced into 4 lobes: on the shortest of these lies a pseudambulacrum modified much as in *Eleutherocrinus*, and towards it the two larger basals stretch up as in that genus. The 4 normal pseudambulacra lie in the depressions between the lobes, each accompanied by a single hydrospire on either side. Three deltoids are large and stretch out over the lobes; two are small and flank the abnormal pseudambulacrum. Anus and spiracles unknown. The

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surface is covered with strong tubercles, which bear minute spines. Most English writers have called this *Astrocrinus.*

H. G. Bronn: Index Pal., Nomenclator, p. 1381; 1848.
R. Etheridge, fil.: Quart. Journ. Geol. Soc., xxxii, p. 103; 1876.
Etheridge and Carpenter: Cat. Blastoidea Brit. Mus., p. 297; 1886.

[Specimens not common, but might be obtained from Scotland. The published figures are very good.]

The PRESIDENT strongly advocated the use of full descriptive labels, which satisfied the needs of two classes of visitors—the shy ones, who were too timid to ask questions, and the troublesome ones, who asked too many. He found that stop-drawers, though useful in many respects, shook specimens very much. Pins were useless in checking the displacement of specimens—nothing but wiring was effectual. With regard to the comparison of recent and fossil forms, he thought it best effected by parallel cases with recent forms on one side and extinct ones on the other.

Mr. QUICK quite agreed with Mr. Bather that the public will not read long descriptive labels, and that important exhibits should have special labels. I beg to show one (just a sample) of those I use, and I find that the "man in the street" will stop and read this, and afterwards, if interested, will read the more descriptive printed label.

Mr. HOYLE gave an account of his unsuccessful experience in attempting to use the labels provided by Mr. Bather in a previous volume of the Association's reports, chiefly owing to the space in provincial museums being so much more restricted than in the British Museum, for which they were originally prepared.

Mr. MADELEY remarked that a series of labels prepared for one museum almost never suits another museum. It appears that curators must resign themselves to the fact that work of this kind cannot be directly copied. The different amount of space available, no less than the different class of visitor generally, compel a quite different method of treatment. Nevertheless, the publication of such series of labels is exceedingly useful.

Mr. BATHER, in reply, thought that his labels would prove intelligible to any student with a decent school education, though ignorant of the special subject. These particular labels were not intended for the general public. He quite agreed that each museum

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must have its own labels adapted to its own circumstances. Mr. Hoyle, for instance, would here find a label for *Pentremites;* but it was to be hoped that he would not use this for his single specimen. It would be unintelligible without the antecedent labels. He put forward these labels as aids to his fellow-curators in the compilation of their own labels, and he believed their intelligence would prove equal to the task. He thanked them for their kindly appreciation of his efforts.

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THE REPRODUCTION OF ART OBJECTS.

By ROBERT F. MARTIN, of the Victoria and Albert Museum, South Kensington.

DURING the last few years many works of art have been reproduced, the making of which may not have been generally known to some members of this Association, and it might, therefore, not be uninteresting to bring to your notice some of the classes of objects so produced.

We all of us know the difficulty which exists at the present time in the purchase of original objects of art. We know that the finest specimens are purchased by the very wealthy who are forming collections, and how severe the competition is in their acquisition. As a consequence, we find that museums, which as a rule have but a small amount to expend, are debarred from purchasing, and even those which have larger sums do not feel disposed to pay the amounts often necessary.

Again, in several of our museums, specimens of many of the branches of the industrial arts are to be seen, but as a rule, so very few in each division as not to be sufficient to form a distinct section. It is very desirable that such sections should, if possible, be extended and so arranged as to be of permanent value to the art and technical student, and one way, and the cheapest, is in the purchase of reproductions.

Speaking with a certain amount of experience, I find that there is a very general idea that the term "reproduc-

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tion" is to be applied alone to those objects reproduced in plaster, and known as plaster casts, or else electrotypes in metal work; and, very unfortunately, this idea seems to be the one set forth by the official record of this Association. Now, if we carefully examine into this matter, we see that this idea is but partly correct, for we find that in nearly all the most important branches of the industrial arts, objects are being reproduced as reproductions, and not as forgeries. Let us take artistic glass work. The Murano glass works have reproduced some of the finest specimens of antique and Venetian glass; a French firm has reproduced specimens of the Arab mosque lamps; and English firms are reproducing Venetian glass. Again, with respect to pottery, we find that the old Maiolica of Pesăro, Gubbio, Urbino, Faenza, and so forth, is being very well copied by Cantagalli, of Florence, whose workshops he is always pleased to show visitors; that the old Hispano Moresque dishes have been copied; that the Turkish and Damascus dishes are reproduced; and Samson fils have reproduced some of the finest specimens of Chinese and Japanese vases, Delft and other pottery, the originals of which are in the Louvre, the Cluny, at Sèvres, and South Kensington. I need hardly refer to the historical series of Fictile ivories, showing an almost complete history of the art of ancient and medieval carved ivory, a set of which, as some of you know, was made by the circulation division of the Victoria and Albert Museum last year at a cost of about £20. Then, again, take the art of bookbinding. Reproductions have been made of the finest of the sixteenth and seventeenth century French bookbindings, by M. Hacquet, of Paris, some fine examples of which were purchased last year by Glasgow, by means of the grant in aid at South Kensington. I admit that these are somewhat expensive, and may be now difficult of acquisition; but a cheaper

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form are the plaster casts of the South Kensington books, which have been painted and copied so exactly that it is difficult at first sight to say that they are not originals. Perhaps some of the experts might say that they do not show the marks of tooling; but, personally, I think they do sufficiently to be of the greatest use to the art and technical students. It seems to me to be a debateable point whether the actual tool-marks should be shown, either in this or in other of the objects of industrial arts. Some experts say that they should, other experts say that they are not necessary.

With respect to bronzes, we most of us know the reproductions of the Pompeiian bronzes, as also those of the Italian schools of the fifteenth and sixteenth centuries.

In another important branch of art, viz., textile fabrics, a difficulty has often arisen in the making of a historical collection in a local museum, owing to the enormous price asked for the old specimens of the Sassanian, Byzantine, Sicilian, and Lucca schools of the sixth to fifteenth centuries.

This difficulty has now been partly overcome by continental manufacturers copying the old historical pieces. If a museum were making a collection of textiles they might well buy these, and endeavour at the same time to obtain very small portions of the originals to place alongside, or borrow originals from South Kensington, so that the technical student could see the process of the old weaving and the materials used.

The art of enamelling has recently come rapidly to the front in our technical schools. Reproductions could easily now be made, even if the old reproductions of Dalpayrat were not obtainable. What more important reproduction could this city have in enamels than that of the murder of St. Thomas à Beckett, rather stiffly portrayed in that

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Champlevé enamel, now on loan to the Royal museum, Canterbury, from South Kensington?

Again, historical pieces of embroidery might be reproduced, and have been reproduced, such as the Bayeux tapestry, worked at Leek and now in the Reading art gallery; and I would strongly urge that the surcoat of Edward, the Black Prince, now in the cathedral of this city, should, by the permission of the dean and chapter, be reproduced, and the reproduction placed over the tomb, and the original placed in the Royal museum.

Johnston's hand-made reproductions of Celtic metal work are amongst the finest of their kind.

Carved wood work, iron work, lace, etc., could easily be reproduced if required, and so we should find that in nearly every branch of art the reproduction of objects is an important matter for local museums; so important is it that the Government yearly make a grant in aid for their purchase "to museums in connection with science or art schools, or established under a municipal or a local authority."

In conclusion, I would venture to hope that these remarks may be the means of enlightening the minds of some of the members of this Association on the subject of reproductions of works of art, and that their value as examples to show the history and development of any particular branch of art may be recognised as sufficiently as it deserves to be.

Mr. MULLEN spoke of the assistance the Salford museum had received from the authorities in South Kensington, amounting to no less than 50 per cent. of the purchase money. He also alluded to the kind attention and aid, without dictation, in the selection of suitable objects which the officers at the Victoria and Albert museums pay to their provincial *confrères* when they call upon them for

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consultation. Salford had recently added to their art galleries some beautiful reproductions of Italian sculptures and some works of Della Robbia that were, at a short distance, easily to be mistaken for the originals, so excellently were the colours reproduced.

Mr. A. LANCASTER said—I would like to express a word of thanks to Mr. Martin for the interesting account he has given of the many useful reproductions of art objects which the authorities of South Kensington are willing to help museums to purchase. An erroneous idea seems to be prevalent that only a few art objects are available, but Mr. Martin has made it clear that a variety of art objects may be obtained. My committee, I feel sure, will be greatly pleased to hear my report of Mr. Martin's paper. Personally, I am much indebted to Mr. Martin for the information he has given.

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HOW TO DEVELOP DELICATE ORGANISMS FROM THE CHALK, AND EXHIBIT THEM IN MUSEUMS.

By Dr. ARTHUR W. ROWE, F.G.S.

THIS lantern demonstration was in part a recapitulation of a paper which appeared in *Natural Science* * dealing with the mechanical preparation of Chalk fossils, so as to render them suitable for exhibition in museums. The author claimed that for soft rocks the dental-engine was an indispensable adjunct to every museum, rendering the work rapid, exact, and finished to a marvellous degree. Fossils which have never before been worked out can now be rapidly manipulated, and he gave as instances the ease with which he could develop *Plocoscyphia convoluta* and other delicate sponges of the white chalk, as well as foraminifera and bryozoa. Examples of cyclostomatous bryozoa were shown, of the thickness of a pin, which had by this means been removed bodily from the matrix, cleaned on both sides, and mounted on a black surface for photographic purposes.

It was also explained that the dental-engine was capable of dealing with harder rocks and bulkier fossils, and the ease with which the intractable lithistids and hexactinellids of the chalk-marl could be cleared from their matrix was quoted in support of this contention. Several workers had given a favourable report on the use of the dental-engine

* A. W. Rowe—"On the Preparation and Mounting of Chalk Fossils."—*Nat. Science*, Nov., 1896.

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in the older and harder rocks, but the author owned that he had no personal experience in this direction.

The use of hydrochloric acid was strongly deprecated, save in the cases of the sponges of the chalk-marl, and of the silicious forms of Flamborough. Even then the work must be slowly and guardedly done, with dilute solutions.

The second part of the demonstration consisted of lantern slides of *Micraster*, and of various brachiopoda, foraminifera, and bryozoa, which were shown to prove with what faithfulness and perfection photomicrography could reproduce ornamentation invisible to the naked eye.

It is obvious that the limitations of such work must be considerable, as the more an object deviates from a plane surface, the greater is the difficulty in obtaining a negative which will give sharp definition over the whole field. However, the objects shown were a fairly severe test of the method, and it was claimed that in photomicrography we had an effective and cheap method of illustrating scientific papers. The plates of the author's paper on *Micraster** were shown in support of this view, and some 12 by 10 bromide enlargements were exhibited as an instance of the value of such work for teaching purposes. Many of the photographs shown could not be surpassed by an artist, and not a few of them were far in advance of the possibilities of the pencil.

The advantage of illustrating museum specimens by photographs was discussed, and it was urged that a photomicrograph showing detailed structure might with advantage be placed side by side with the fossil. Many forms, such as bryozoa and foraminifera, can only be illustrated in this way, or by models, and the advantage of the photograph, on the score of expense, was obvious.

* A. W. Rowe—"An Analysis of the Genus *Micraster*."—*Quart. Jour. Geol. Soc.*, vol. 55, Aug., 1899.

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This need for illustrative photographs led the lecturer to make a strong plea for the institution of a photographic laboratory in every large museum, and especially in our national museums. There, in any case, he claimed that we should have the best laboratory and apparatus that brains could devise or money purchase, and that it should be staffed by the best scientific photographers procurable. He held that every type, and every valuable specimen, should be photographed, in case of destruction by fire or accident. All museums should have the power of obtaining these photographs at cost price, and amateur workers should have the same privilege at a slightly increased cost. He pointed out that it was impossible that the work could be done by the ordinary staff, as few of them have the special knowledge, and none of them have the time to devote to such exacting work. Moreover, the risk of entrusting precious types to the unskilled hands of unofficial photographers was too great to be contemplated.

The lecturer suggested that the tablets on which specimens were displayed might readily be made more explanatory to the student, and that more information might be given thereon. Speaking for himself, he felt that an abbreviated reference to the original description, and to an accessible figure of the specimen, might profitably be added. The only objection to such a course was the possibility that the student might be misled into thinking that he was studying the original type. This could be readily obviated by mounting the types on different blocks, and by the legible use of the word "type." He added that it would be better to print the labels, and that if a press were too great a luxury, the work could be done by a typewriter, as machines are now made which carry a very small type.

Lastly, he ventured to hope that museum authorities

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would insist on obtaining the exact locality and derivation of all newly acquired geological specimens. No specimen should be bought or accepted without this all-essential information being attached to them, for in our present position of advance in the knowledge of zonal distribution, every fossil not so localised is robbed of all zoological value. In the case of old types such considerations must perforce be ignored, for they must be acquired in spite of their shortcomings. The days are past when we can display a fossil with the legend: "Chalk—South of England." Zonal geology demands of us a rigid accuracy. Anything short of this is equally ludicrous and reprehensible.

Mr. HOYLE asked one or two questions regarding technical details.

Mr. F. A. BATHER supported Dr. Rowe's plea for a photographic laboratory at the natural history museum, and especially the need for a trained photographer. The already over-burdened assistant had not the time to learn photography in his old age, and so stuck to his lithographer. Printing, too, was admirable, but when one printer had to cope with the work of ten, it saved time and temper to write one's own labels. The dental-engine was admirable for rocks in which the matrix was appreciably softer than the specimens, but for crystalline limestones and the older shales he preferred a needle. The rotary motion of a sufficiently hard brush often turned a drill, so that it was safer to brush by hand with irregular motion.

Mr. QUICK remarked that he thought Mr. Bather paid rather dearly for his photographs at 5s., as he had had several photographs taken for him at the British Museum (Bloomsbury), through the kindness of Mr. Read, by the museum photographer, or by one of the officials, at 3s. 6d., which includes one copy and the negative. He also wished to inform Dr. Rowe that in the new Horniman museum a room had been set apart for the use of the photographer.

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PHOTOGRAPHY IN MUSEUM WORK.

By J. W. Carr, M.A., F.L.S., F.G.S., University College, Nottingham.

[Abstract.]

AMONG the most helpful of modern developments in the work of a natural history museum is the increasing use of photography in illustrating features which cannot be adequately represented by specimens alone. Thus, in the geological department the usual collection of minerals, rocks, and fossils may be supplemented with great advantage to students, and at the same time be made of much greater interest to the general public, by a judiciously selected series of photographs, illustrating phenomena such as marine and atmospheric denudation, stratification, inclination and folding of strata, jointing in sedimentary and igneous rocks, faults, glaciation, raised beaches, etc.

In zoology a vast amount of valuable information may be conveyed in the same way as to the habits, habitat, and association with other forms of all classes of animals. Birds in particular furnish innumerable opportunities in this direction. Is a species solitary or gregarious when breeding, does it nest in trees or hedges, on the ground in a meadow, among the rushes on a river bank, or on ledges of a sea-cliff; does it build a nest, or lay its eggs on the bare ground or in a burrow? On all these points the desired information may be given by means of photographs, and the difference often observable in the habits of nearly allied species, such, *e.g.*, as the house-martin and

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the sand-martin, the meadow and the rock-pipit, etc., can be readily shown.

Some beautiful photographs have been recently published of a rock-pool in limestone on the Donegal coast, showing a group of the purple sea-urchin of all ages and sizes resting in their burrows, and associated with them are limpets, periwinkles, *Purpura lapillus*, barnacles, the tubes of *Sabellaria*, tufts of coralline algae and *Fucus*, etc. Such views convey a vivid impression of the habits and surroundings of these marine invertebrates, and form an instructive addition to the echinoderm series in a museum.

Other subjects which suggest themselves as suitable for photographic treatment are groups of gregarious insect-larvae on their food-plants, the snares and nests of spiders, nests of hymenoptera, etc.

Nor is photography without its uses in the herbarium. The "habit" of our forest trees cannot be shown by the dried twig on the herbarium sheet, but may be perfectly seen in a good photograph. A series of views of the vegetation of selected localities—for example, a hayfield, a shady hedgerow, a river bank, a gravelly sea beach, and a rocky cliff—will show what plants normally grow in company, and under different conditions of light and shade, moisture, soil, etc. The striking differences in the nature of the flora under differing physical conditions are well shown by the exquisite series of views in Praeger's "Open-Air Studies in Botany," the originals of which are on the table before you.

With regard to the method of exhibiting such photographs in the museum:—in shallow wall-cases, when not too crowded with specimens, the views may be fixed to the back of the case at a suitable height from the floor. When this cannot be done, any vacant wall-space between the cases, on staircases and landings, the panels of doors, etc.,

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may be utilised. Stands of revolving glazed frames may also be used with advantage. In the Nottingham museum the photographs (all of which measure 8 by 6 inches, except a few 28 by 22-inch enlargements) are mounted in sets of two to six, arranged in one or two rows, either horizontally or vertically, according to the space available. They are enclosed in plain black frames, and a printed descriptive label is pasted on the mount under each view.

[The above paper was illustrated by a large series of photographs of geological, zoological, and botanical subjects from the Nottingham museum, and by lantern slides of the same, all of which had been prepared and supplied by Mr. R. Welch, of Belfast.]

The PRESIDENT expressed his admiration of the beautiful series of photographs exhibited, and called attention to the British Association Committee for preservation of geological photographs. Especially he praised the photographs of flowers, and those of echini nesting in tideways at Bundoran, Ireland.

Prof. FLINDERS PETRIE remarked that for some subjects stereographs were desirable, and such could be readily made by tilting the objects slightly for a second photograph, or by moving the camera laterally, if a larger object was taken. Such double photographs could be mounted stereoscopically in a museum at the cost of a shilling or two for spectacle glasses.

Mr. HOLMES said that it would be very useful to working botanists if photographs of type specimens of plants were obtainable from the museums in which such types existed, as they would enable the botanist to settle many points which could only be determined by a journey, that, in many cases, would be long and expensive. In the case of accidental destruction of any such types, the photographs distributed to other museums would become invaluable as records.

Dr. MANTON said that the beautiful examples thrown upon the screen showed the advantage of hobby-riding and specialising. If an enthusiastic photographer devoted himself to illustrating some section of science, the results were almost invariably satisfactory. As a veteran photographer, long before the dry plate days, he only too well understood the technical difficulties that had to be surmounted before such splendid results could be achieved.

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A SUBSTITUTE FOR CARD FOR SETTING COLEOPTERA, etc.

By Thos. Midgley, Bolton Museum.

WHILST recognising the additional safety of an insect having a protecting support under its delicate legs when stretched out on card, the strong objection of working entomologists to this system has been that in insects so mounted it is impossible to examine the underside of the specimen, which is always desirable, sometimes, in fact, necessary, in identifying closely allied species. To overcome this drawback, thin sheets of mica seem to have been used in the early days, many insects so mounted, and dated about 1860, being in our collection. No suitable cement for fixing the insect seems to have been found, as, in all that we have at any rate, the gum is shaling up off the mica, rendering its fragile burden very insecure in the event of a sudden jolt to the drawer.

The idea of a transparent support seeming a good one, an attempt was made to find one more suitable for our purpose than mica, what was required being something stiff enough to bear the insect and hold a pin, and transparent. The thing nearest to hand was a spoilt "Frena" photographic film. This, when rid of the sensitive layer by soaking in water, is almost as clear as glass and quite stout enough for most things. Any other kind of cut film having a smooth surface will, of course, answer; but many have the surface of the celluloid "matt," in which case they require coating with

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a thin solution of celluloid in acetone, which causes the film to buckle and twist to a great extent.

The fixative I have found most satisfactory is the above-mentioned solution of celluloid in acetone. It should be made thin enough to work easily with a brush, and, like tragacanth, a very little solid matter is necessary to give this strength. Any kind of waste photographic film may be used to make the cement; "Kodak" roll films being as good as any, of course being used after all the sensitive layer has been thoroughly cleaned off.

Acetone being very volatile there is not time to set the legs, etc., of an insect whilst using this cement, before it hardens. I find it best to mount in the ordinary way with tragacanth on card. After the specimens are thoroughly set and hard they are damped off with water and allowed to dry. A small dab of cement is then put on the celluloid strip where the body of the insect will rest and the specimen lifted on to it *immediately*. It is fixed in its place in a second or two. Owing to the tendency of the celluloid to buckle out of shape, it is better to mount in this way than to coat the slip all over with cement.

The celluloid may be used in thin strips, and the specimen mounted either across or at the end. Many hymenoptera are mounted in this way by collectors, who, I think, would find celluloid a better support than card.

Its advantages may be thus summed up—

Perfect visibility all over the specimen, even with a high power lens.

Its colour does not change with time like card.

The pin has a much firmer grip, so that there is no fear of specimens twisting round when raised a good height on the pin.

Catalogue numbers or locality labels can easily be read through the celluloid.

Lastly it is cheap; an ample supply of celluloid films can always be had, if not from our own "wasters," then from the "unfortunates" of amateur photographic friends' exposures.

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FINANCES OF RATE-SUPPORTED MUSEUMS AND ART GALLERIES.

By Ben. H. Mullen, M.A.(Dub.).

I HAVE gathered, from many disconnected conversations with members of committees and with officials in charge of museums and art galleries, that in the very important matter of dealing with credit balances at the end of the financial year the method differs considerably in different towns. With the view of comparing these methods I wrote to nineteen museums and art galleries supported by rates, asking the curators the following questions:—

1. Have you adopted the Museums and Gymnasiums Act, 1891?
2. When you have a credit balance what becomes of it?
   (*a*) Is it carried forward, accumulating as a kind of reserve fund?
   (*b*) Is the rate that is levied in the following year reduced by the amount of that balance?
   (*c*) Is the balance placed in a general fund in the town, to be devoted to making good deficiencies in other departments which have overspent their estimates?

From seventeen institutions I received replies, and of these,

1. Six have adopted the Museums and Gymnasiums Act.

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2. Eight carry forward their balances; two take credit for the balances in next year's estimates; three put their balances into the general fund of the town; two do not seem to have a separate rate at all; two "never have had a credit balance."

Of the six institutions which have adopted the Museums and Gymnasiums Act,

Four carry forward their credit balances without interference with the next year's rate; none take credit for that balance in next year's rate; one puts its balance into the general fund of the town; one "never has had a credit balance."

The above replies evidence a striking divergence of custom and display a remarkable want of that uniformity which it is the desire of the Museums Association to bring about for the benefit of all public free museums and art galleries in the kingdom, whether connected with the Association or not.

It may, I think, be conceded that when money is raised for a specific purpose by the rates of a town, it should be expended upon the object for which it has been levied, and upon no other; and that, consequently, when there remains a balance from the estimated expenditure of a museum and art gallery committee, that money should be spent by that committee on objects connected with the institution under their control, and should not be devoted to any other purpose. It is, I think, all the more imperative that this principle should be recognised because of the fact that the museum, the public library, and the technical school—the only purely educational factors under the control of the urban authority—are, at the same time, the only departments that are restricted in their rating powers.

It is a matter of great importance for towns which

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have the higher education, the enlightenment, the refinement of their inhabitants at heart—and what town has not?—to adopt the Museums and Gymnasiums Act. Its adoption confers at once a recognised status, a differentiating brand, and a possibility of greatly increased usefulness that without it would be lacking. Nor must it be forgotten, by towns that support both a museum and library under the Public Libraries Act, that immediately upon the adoption of the Museums and Gymnasiums Act, the library is relieved of the annual cost of the upkeep of the museum, and is thereby and to that extent enriched. So far as the keeping of museum accounts is concerned, it is important to notice that the Act specifically requires that "separate accounts shall be kept of the receipts and expenditure of an urban authority in connection with any museum established under this Act." In the case of the solitary institution referred to above, which has adopted the Act, yet puts its balance into the general fund of the town, I wonder under what head in the accounts is that transfer placed; and whether or not the auditors pass as "for the maintenance of the museum," such an item as "to the relief of the scavenging department"!

The clause in the Act which says that "the amount expended by an urban authority under this Act shall not, in any year, exceed the amount produced by a rate of a halfpenny in the pound for a museum established under this Act," clearly lays it down, for the protection of the ratepayers, that no more than a halfpenny in the pound can be levied in any one year. It says nothing whatever about balances, but leaves it to the business instincts of those who control the museum to deal with them as with all other matters connected with the institution. I am not in a position to express an opinion on finance, but it appears to me that

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if the museum accounts are to be kept separate from other accounts in the town, they must be so kept right through to the end, and that if a museum committee finds itself, at the end of the year, with a credit balance in its current account, there is nothing in the Act, there is nothing in common sense, to prevent them placing that sum—still in the museum account—on deposit at their banker's.

The Act is drawn up in no narrow-minded nor ungenerous spirit. It is framed for the open-handed benefit of museums and gymnasiums. And in an Act which clearly directs that separate accounts are to be kept for the museum, and which, far from attempting to hamper or even direct the powers of the urban authority, empowers it to "do all things necessary" for the maintenance of the museum—in such an Act, I maintain, it ought to be difficult to find the suggestion either that credit balances are to be handed to another department to expend, or that they are to be placed to the credit of the next year's museum rate. Apply the principle to everyday life. Where is to be found the man who would consent to the reduction of his next year's salary by the amount he has saved by want of opportunity to wisely spend the money out of his present year's pay? Would he not, rather, put it by until wanted? Or who would consent to have his year's savings given over to some one else to use?

I would suggest that those towns which have not yet adopted the Act should do so, and that those which have adopted it should ear-mark the annual sum on the rate-note, in order that the moneys raised for museum and art gallery maintenance could not by any possibility be used for another purpose. This, in addition to the keeping of separate accounts, as unequivocally directed by the

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terms of the Act, would seem to indicate a fair and workable basis for the financial conduct of museums throughout the country.

As matters now stand in some towns, if the income of the museum committee be overspent, the deficiency is deducted from its next year's available income. If, on the other hand, there be a credit balance, an ungovernable desire arises to transfer it to some overspent department in the town, and the robbing of Peter in order to make some reckless Paul financially sound is accomplished. This is an excellent example of the system popularly known as "Heads, I win; tails, you lose!"

Any system that urges a museum committee to expend its year's income up to the last stiver must be bad and dangerous, as tending to encourage the purchase of undesirable or mediocre objects, bought solely for the sake of expending the money.

Those who are concerned with the conduct of museums and art galleries can never know when the opportunity may arise of adding some notable collection, some renowned work of art, to the treasures of their institutions. Such objects are not to be ordered as desired—like coals, bricks, machinery—and therein the museum and art gallery department differs from every other in the town. When such objects or collections are in the market it is only the town that is financially prepared that can hope to purchase. For this most practical reason alone balances should accumulate. I would, in reason, put a limit upon the reserve fund, and say that it should not exceed the amount produced by ½d. in the £ in one year.

A few extracts from some of the letters I have received will be of more use in guiding members of the Association

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to the formation of an opinion than any words of mine. The following are some:—

1. "A balance is never deducted from the next year's rates. I do not think it would be legal. Irrespective of what we save or exceed in the year's income, the rate remains the same. I don't think the moneys, consisting of credit balances, could be devoted to relieving other spending departments." (Museums Act adopted.)

2. "The balances are not carried to another fund, and the museum account is treated as an exclusive one."

3. "The balance, whether debit or credit, is carried forward to the museum account, and does not affect next year's rates. We sometimes let the balances grow for several years in order to meet special expenditure." (Museums Act adopted.)

4. "Credit balances are carried forward to the next year. The rate levied the following year is not reduced by the amount of such credit balance, nor is the balance devoted to making good any deficiencies in other departments." (Public Libraries Act.)

5. "Any balance we may have in hand at the end of the year is carried over as a reserve fund and used as occasion requires. No reduction is made in our next year's allowance on account of these balances. Our funds are never transferred to other departments to make up deficiencies there; nor, indeed, could they, I think, be legally so transferred." (Museums Act adopted.)

In conclusion, I should observe that Salford, which has not been included in my remarks, adopted the Museums and Gymnasiums Act in the year 1894, and that great benefit has accrued therefrom to the museum, art galleries, and libraries in that town.

[*Note by the President.*—The Treasury has agreed with the trustees of the British Museum to allow them to retain from year to year any unexpended balance under the sub-head of "Purchase of Specimens," such balance to be used for purchases only, and for no other purpose.]

The PRESIDENT strongly approved of the plan by which the heads of the museum departments were able to accumulate funds when necessary to meet demands that might arise suddenly. Before this was allowed great difficulties were often experienced at the British Museum: in some years the grant was not fully spent, and this led to its decrease in the future—while in other years valuable collections could not be secured in consequence of an insufficient grant and the lack of a reserve fund.

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GENERAL NOTES.

Among the changes in the staffs of museums during the past year may be mentioned the appointment of Prof. Grant-Ogilvie, Principal of Heriot-Watt College, Edinburgh, to be Director of the Museum of Science and Art, Edinburgh, in place of Sir R. Murdoch-Smith, deceased; Mr. C. H. Hunt, curator of the Bootle museum, in place of Mr. J. J. Ogle, who has been appointed director of technical instruction; Mr. Gill Parker, curator of the Ruskin museum, Sheffield, in place of Mr. William White; and Mr. Robert A. Buddicom, B.A., F.G.S., curator of the museum and art gallery, Plymouth, in place of Mr. T. V. Hodgson.

In forwarding the guide book to the museum and art gallery, Perth, Western Australia, Mr. Bernard H. Woodward, the curator and secretary, writes:—"I have duplicates of many of the marsupials and birds in the lists therein printed in case you wish to make any exchanges."

The proper labelling of museum specimens is admittedly one of the most difficult, as it is one of the most important subjects that a curator has to deal with. A certain uniformity in the labelling of museums would undoubtedly be beneficial, and there are always sufficient similarities of arrangement to make labels interchangeable in all museums. This subject has often been debated at the Museums Association annual meetings, though so far no definite plan has commended itself to the general body of members. Mr. Hoyle, of the Manchester museum, has now put the matter into a practical form by the issue of a series of labels that are not only available for his own museum, but might be just as serviceably used in all museums. These include family labels, simply giving the names of the families of mammals, birds, and fishes, to be placed in the cases with these groups; and no matter what difference of opinion there might be as to

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the proper classification of these groups in their higher divisions, such as classes, sub-classes, and orders, the family divisions will be recognised generally as the same everywhere. For any museum to print these labels just for its own use would involve such expense as many of them are not prepared to meet, and they can obtain them from the Manchester museum for a few shillings. More important even than these name labels is the series of descriptive labels of the sub-classes and orders of mammalia, in which each group has its chief characters and habits specified in language exact and intelligible. To write a short descriptive label of a group of animals requires knowledge, powers of condensation, and true insight into the relative values of points of structure and habit that few people possess. At the Manchester museum there is available the special knowledge of those engaged in Owens College, which gives them the opportunity of doing this work more satisfactorily than it could, perhaps, elsewhere be accomplished, and if every museum possessed a set of these labels in its cases, there is no doubt that its educational value would be greatly increased. From the point of view of the "man in the street," it may be thought that these labels are rather too severely scientific, but then, precise knowledge must be given in tolerably precise language, the chief point being to emphasise the essential facts. These labels will be very helpful to museum work everywhere, and the smaller institutions will find a special advantage in using them.

An interesting illustration of the application of photography to museum work has been furnished by Mr. Henry Irving, of Bromley, Kent, who has published a series of photographs of trees, their stems, flowers, and fruit. The photographs of the trees as a whole are tolerably large in size, but do not appear to give with sufficient distinctness the specific characters of the trees. But those of stems, flowers, and fruit leave nothing to be desired, and will be of immense service in enabling students and museum visitors to recognise at once any particular tree they meet with in their walks.

Sherborn's "Index Animalium."—By "Index Animalium" is meant an index to the original place of publication of every name, whether valid or invalid, that has ever been applied as the generic

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or specific denomination of an animal, recent or fossil. The Committee has decided to deal first with the names occurring in literature published from 1758 to 1800 inclusive. The examination of this literature has been carried on by Mr. C. Davies Sherborn at the Natural History museum, under a committee appointed by the British Association, consisting of Dr. H. Woodward (Chairman), Mr. P. L. Sclater, Rev. T. R. R. Stebbing, Mr. R. MacLachlan, Mr. W. E. Hoyle, and Mr. F. A. Bather (Secretary).

Work was begun in 1889, and up to the present time the whole of the literature between 1758 and 1800 has been indexed, and about one-half of that between 1801 and 1850. It is hoped that the question of printing the first part of the work will be discussed this year, as the final examination of the MS. is now in progress. Generous co-operation has been shown by the Royal Society and the Zoological Society, and valuable assistance has been received from several foreign academies in the loan of rare books.

One of the most valuable features of the compiler's work has been the mass of information obtained, and in part printed, as to the date of publication of various books which appeared in parts. Lists of these will be found in the reports of the British Association. The great difficulty of finding the original place of publication of plant-names, as stated by Darwin, led to the compilation of the "Index Kewensis" by Mr. Daydon Jackson, a work in which all names applied to flowering plants up to 1885 have been recorded. It is hoped that the "Index Animalium" will render the same assistance to zoologists as the "Index Kewensis" has rendered to botany. The references will be arranged under "species," the "genera" appearing in alphabetical order in their proper places, and this arrangement will allow of the easy identification of the various genera into which a species has been placed from time to time.

In the last Report reference was made to the grant made by the Science and Art Department, now officially altered to the Board of Education, towards the purchase of objects for provincial museums, and a table of the amounts granted was printed on page 127, which showed that in 1881-82 the grant voted was £1500, and this sum was reduced to £500 in 1883-84, chiefly

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because the whole amount was not previously applied for. It remained at the lesser sum until 1898-99, when it was increased to £750, and in the following year it was further advanced to £1000. Even that amount is inadequate to meet the applications sent in, and many museums have had to go empty away, preference being always given to the purchase of reproductions, which entirely shuts out those museums which endeavour to form collections specially suited to the requirements of their localities, and which do not admit of suitable reproductions of the objects required, such as arms, metal-work (other than gold and silver), lace, textiles, cutlery, pottery, and many others. It is only natural that these museums should feel themselves unfairly treated, nor is it altogether intelligible why reproductions only should be exclusively encouraged, when the grant is not sufficient to pay for these and original objects as well. There would be no difficulty in showing that in many cases original objects would better serve to increase the excellence of artistic design applied to industry, than reproductions, while it is obvious that to the craftsmen the evidence of the maker's own handicraft on an object is infinitely more serviceable than could be a mechanical reproduction, however near perfection it might be in form and ornament. On purely commercial grounds it might also be reasoned that as this money comes from the taxpayers in general its distribution should also be as general as possible. Would there be any hardship in dividing the money equally amongst all the museums in the kingdom that applied for it, with the safeguard that the objects purchased by the museum should be approved by the Board of Education? With the present system some museums get many hundreds of pounds, whilst others get nothing, not because the objects they have purchased are not suitable, but simply because the whole of the grant in aid is applied to reproductions. Perhaps with the disposition shown by Parliament in the last two sessions to place more money at the disposal of the Board of Education, the wants of all the provincial museums may be fairly met, and these anomalies disappear. There is reason to believe that if the Parliamentary vote was raised to £1500, its original sum, it would meet the more pressing present needs.

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It is pleasant to notice the advancing efficiency of the circulation department of the Victoria and Albert museum, which, notwithstanding the increasing demand made upon it, is giving very general satisfaction. There is still need for additional objects to make the collections sent out to museums more historically valuable, and to show the development of certain forms of design and styles of ornament; but so far as the means at their disposal will permit, the officials of this department are doing their work in a praiseworthy manner, affording valuable assistance, especially to the smaller museums where the services of an expert curator are not always available. The loans sent out by the circulation department are intended to affect the general art taste of the public, as well as to give direct art teaching to the student and craftsmen, and to assist manufactures. As this latter is perhaps their more important function, it may be permissible to point out one hindrance that sometimes arises, and which seems by no means difficult of adjustment. It not infrequently happens that for the purpose of applying the design or ornament to present-day manufactures it is necessary to take a cast or copy of the object; but as they are all locked up in cases, and the keys kept at the Victoria and Albert museum, this cannot be done without an officer being sent specially down to the provincial museum as opportunity serves. This they very willingly do, though it may involve a delay of a few weeks or months, which the waiting student or manufacturer cannot afford, and it therefore happens that frequently the objects cannot be used in this practical way. It will be obvious that the Board of Education cannot allow the keys of their museum cases to be left in various parts of the country with people over whom they have no direct control; but as the cases they send to different provincial museums to hold the objects on loan from the Victoria and Albert museum are very seldom changed, it would be quite feasible, and indeed desirable, that those towns which required access to the cases for purposes of study or reproduction should fit their own locks to the cases, depositing at the same time one or more duplicate keys with the Board of Education. It might also be made a condition that notification should always be given to the Board before any case was opened, and that the exact purpose for which it was proposed to open it

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should be stated. In this way the objects on loan might in many places be made of much greater utility than they are at present.

While dealing with the circulation department it may be appropriate to mention here the useful series of lectures on the Victoria and Albert museum, and other related subjects, given in various parts of the country by Mr. R. F. Martin, one of the officers of the department. Particulars of these can be obtained from Mr. Martin.

MUSEUM REPORTS.

British Museum (*Natural History*).—The blue-book, containing a summary of the operations of the Cromwell Road section of this great institution for 1899, is too voluminous, and the work is too extensive, to allow of a complete abstract here, and it will, therefore, only be possible to refer to a few points. The visitors during the year numbered 422,290, of whom 55,718 visited the museum on Sunday. Dark days are not in future to shut out the public from the museum, for the electric light is being installed. The memorial statue of Professor Huxley has been placed in the hall of the museum. The trustees have agreed to co-operate in various surveys and expeditions, and a summary is given of the expedition to Sokotra (also referred to under the Liverpool museum), as well as of various other explorations carried out by the museum staff, together with a list of the collections thus formed. The acquisitions made to the zoological collections number 98,421 altogether, of which 80,631 have been secured by gift, 10,794 by purchase, and 6996 by exchange. The number of visits paid to the zoological department by persons who have required assistance or attendance amounted to 10,728, gratifying testimony to the practical use made of the museum, there being, doubtless, a much larger number who go for personal study without requiring assistance from the staff. In the geological department much work has been done in rearranging, labelling, and describing the collections; the list of descriptive labels which have been printed off showing the

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extreme value of a printing machine in museum work. The number of students in this department was 4479. In the mineralogical department there were 34 meteorites acquired.

American Museum of Natural History.—The value of the report for 1899 is greatly increased by a series of illustrations, the first of which gives the south-front view of the museum—an exceedingly handsome and extensive building — while the other illustrations show some interior views and mounted specimens of wonderful perfection. The museum possesses a very generous board of trustees, who made a grant of nearly £14,000 to wipe off all indebtedness, and the total income during the year was over £30,000. The operations of the museum are too vast to be even enumerated here, including, as they do, explorations in various parts of the great continent of America. The paragraph on the use of photography is of special value, and is here quoted:

"Photography has become of increased importance both in connection with exhibition and publication. We have now developed an almost perfect system of photography. Our field negatives are systematically arranged in large albums, and the negatives duly numbered as the permanent property of the museum. Enlargements are used in the cases showing the process of discovery and excavation of the specimens in the field, and photographs are used in connection with descriptive labels to illustrate typical specimens in the several departments."

Blackburn.—In the report for the year ending 31st July, 1899, the committee acknowledge with satisfaction the adoption of the Museums Act, and although the Council has only at present granted an additional farthing in the pound, yet the full halfpenny allowed by the Act will doubtless soon be available. Specimens of oriental arms and armour, and a collection of old Wedgwood ware, have been added. Progress is also being made with the artistically mounted collection of Lancashire birds, which is such a delightful feature of this museum.

America: Field Columbian Museum, Chicago.—This active museum is not only justifying its existence by the exhibition of specimens, but is disseminating knowledge over a wide field by extensive courses of lectures, and by carrying out researches and scientific expeditions over a large area. The publications issued for the year ending 30th September, 1899, number twelve, and it

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appears that there had been twenty-eight in previous years, embracing papers on geology, zoology, and botany. Besides these they have on hand 1667 slides illustrative of 53 different lectures. The total number of specimens acquired during the year was 17,348. The annual report gives further particulars of these additions, and also an account of no less than eight different expeditions carried out in various parts of America, four of which were under the direction of the curator, W. G. A. Dorsey. A number of clear, well-produced illustrations are given relating to these expeditions, and also showing views of cases and mounted groups in the museum, which show the great care successfully used in displaying the specimens in the museum, which is carrying out, as will be seen from these few facts, most useful and valuable work in the advancement of science, not only extending the knowledge, but giving intense pleasure and satisfaction to the people who have the good fortune to find such an admirable museum in their midst. Amongst these it is gratifying to find such a large number of teachers and school children using the museum for distinct educational purposes: as many as 64 classes of 30 pupils or more, from Chicago, visited the museum during the year. This is getting hold of the children in a thoroughly satisfactory manner.

Bolton.—In addition to the ordinary duties of the museum the curator at Bolton carries on systematic meteorological work, published in monthly and annual summaries, of a very useful character. This appears to be done more as a personal hobby than as an official duty; and that it in no way interferes with the interests of the museum is shown by the record of admirable work which the report for 1899 reveals. The paper on the Dublin Science and Art museum, which was read by Mr. Carpenter at the Dublin meeting of the Association, has borne fruit at Bolton, where they have carried out the idea then explained of illustrating the history of animals. Bees and colonies of ants are shown alive in glass observatories, which have attracted a good deal of attention, and must add greatly to the general knowledge of these interesting insects. Lectures are given at the museum, and visits for direct teaching purposes are made by scholars. The list of additions is useful and well selected.

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Bootle.—This thriving town appears to be specially favoured in its finances, for, in addition to the rate, there is a grant of £400 from the technical instruction account for library and museum purposes, the total sum devoted to these institutions being £2500. The division of this seems rather one-sided, for the museum gets only £213, while the library has £2290, or ten times as much as the museum. It appears to prosper even in poverty. The curator, according to the report for the year ending 31st March, 1900, delivered half a dozen free lectures in the museum, covering the subjects of botany, zoology in nearly all its branches, as well as rocks and fossils—a truly exhaustive ramble through nature's realms. The following paragraph from the report shows the most important advance made by the museum during the year:—

"The chief work in this department has been in the preparation of cases, labels, etc., for the proposed collection of things relating to commerce and industry. A series of large labels has been given by the Science and Art Department: these have been framed and placed on the walls of the middle upper room. Most of the objects referred to in the labels are on order, and will soon be placed in the handsome cases now prepared for their reception. The miscellaneous collection of insects has also been taken in hand, and is being reset in a new cabinet. The following have been purchased:—An Australian native bow and darts, a Chinese mirror, a weaver bird's nest. Mr. Frank Moore has been employed temporarily in museum work according to need; he has recently been appointed Government osteologist to the colony of Victoria."

Bradford.—The art collections of this museum are being steadily augmented by judicious purchases made by the committee, and the interest in the art gallery is stimulated by frequent special loan exhibitions of pictures, not less than four of these being held in the year 1899. The plans for the new museum and art gallery have been adopted, and Bradford will soon possess a building for these purposes worthy of the high position it holds amongst the municipalities of the kingdom. Like most other towns the libraries here absorb the largest share of the income, the amount devoted to them in the year being £5500, as compared with only £1400 for the museum. Still, out of this sum the committee have wisely invested £660 in the purchase of new pictures.

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Cambridge: Woodwardian Museum. — The report of the Museums Syndicate for 1899 records many important additions made to the collections, including specimens received from five different expeditions in various parts of the world under the charge of fellows and students of the colleges. Mention is made of a proposed new building for the botanical collection, and those acquainted with the museums at Cambridge will recognise that this step is not being taken before it is urgently needed. Indeed, the Woodwardian museum deserves a more spacious and better-adapted building than the one which now imperfectly accommodates it. The "Sedgwick Memorial" museum, which has been for so many years delayed, has at last commenced to be built on a site acquired in the grounds belonging to Downing College, nearly opposite to the museum of anatomy and comparative zoology. The new museum is already some 25 feet above-ground, and will present an imposing frontage when completed.

Carnegie Museum, Pittsburg. — The Carnegie institute is evidently a spacious and convenient building, though, judging from the illustration which serves as a frontispiece to the report for the year ending 31st March, 1900, it has no elaborate pretensions to architectural beauty. This is the third annual report, and the museum is evidently one of recent growth, and is quite obviously endowed with an unusual share of youthful vigour. No register is kept of the actual number of visitors, but the record of attendances shows that the museum is widely used for educational purposes. The accessions numbered 51,298 objects during the year. Details of these are given, as well as notes on the condition of the various collections, and the report is enriched by a number of excellent illustrations.

Chester: Grosvenor Museum.—Among the additions made to this museum in 1899 was a collection of land, freshwater, and marine shells, embracing nearly all the known British species, including many that are rare. Extensive additions were also made to the entomological section, and the total number of specimens added in all departments was 9810. The museum appears to be maintained, and very efficiently so, by the Chester Society of Natural Science, Literature, and Art, and the curator's

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report is embodied in their proceedings, which also contain various scientific papers with some very good illustrations.

Colombo.—In the report for 1898 there is an important report by the director on the use of formol as a preservative, and his experience will probably be of assistance to many curators. In 1899 the number of visitors was 113,170, of whom 106,657 were natives. A list of the additions to the collections is given, which shows good progress in all departments.

Glasgow.—Museums and art galleries flourish in this enlightened municipality in a most abundant manner. The modest little report for 1899 deals with four museums and art galleries under the management of the Corporation, superintended by our popular and gifted past president, Mr. Jas. Paton. To these will soon be added the most important and imposing of all—the new art gallery and museum in Kelvingrove Park, whose birth is to be signalised by an Exhibition of an international character, such as well befits the advent of such an all-powerful agency for public good and enjoyment. As old things must, sometimes regretfully, give place to new, so must the old Kelvingrove House—which has so inadequately housed (or warehoused) the natural history treasures of Glasgow—be sacrificed to the requirements of the great Exhibition. Whatever its local associations may have been, its inherent attractions were not of a deeply impressive character, and are likely soon to be forgotten in the more ample and abiding beauties of the new building. Among the additions to the collections last year were the fossils from the Glasgow Geological Society, chiefly local specimens, which must be of great importance to the work of geologists for all time, and it is satisfactory to know that they are thus permanently preserved. Many important pictures and other works of art have been acquired by gift, bequest, and purchase, and there is little doubt that the collections will be well worthy the grand building preparing for their reception. The authorities of the Glasgow museums and galleries know no narrow selfishness, and they have lent their treasures freely to other institutions, as well as allowed various reproductions to be made for publication. One could wish that this spirit of helpful liberality might extend to

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other similarly situated bodies in other places. Saturday night is the time selected for popular evening lectures in the Corporation galleries, a selection amply justified by the large attendances. A comparison of the statistics of the several Glasgow museums and galleries has rather an important meaning. It is often assumed that an art gallery is more popular than a natural history museum, and that a museum in the centre of a city attracts more visitors than one in a park outside. Yet at the Corporation art galleries in the city the number of visitors was nearly a hundred thousand less than at the museum in Kelvingrove Park, the actual figures being 134,951 at the galleries, and 232,097 at the museum. Then, again, the benefit of placing a museum and art gallery amongst the labouring and poor people is shown in the case of the People's Palace on Glasgow Green, which had 481,737 visitors in the year, 150,000 more than visited the Liverpool museum. What is a people's museum is not yet distinctly understood by all municipalities, even though they have great possessions and high culture.

Hereford.—Although the names of nine honorary curators are given in the annual report of the committee of the public library and museum for 1899-1900, the only mention of the museum is the gift of two birds, a plan, and a spear. The committee are evidently restricted in their work by shortage of funds, though this scarcely justifies the apparent lack of interest in working up the natural history and archæology of the important district in which this museum is situated, which ought to be the chief aim of its existence.

Ipswich.—This museum has had the good fortune to acquire permanently the collection of palæolithic and neolithic implements found in Suffolk by the late Mr. Simeon Fenton, which had been on loan in the museum for many years, and on that gentleman's death the museum authorities also purchased the whole of the Suffolk bronze weapons. Many other important additions have been made to the museum collections, local natural history and archæology very properly receiving marked attention. A new wing has been added to the museum, to be specially devoted to the natural history of the county. Besides the science museum,

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there are picture galleries in the Christ Church mansion, to which nineteen oil paintings were presented in 1899, being portraits of German musicians and poets. The report for 1899 also deals with the technical schools under the same committee as the museum and art galleries, and it is quite evident that all these agencies for good are well appreciated and supported in Ipswich.

Jamaica.—In forwarding the annual reports of the institute of Jamaica for the two years ending 31st March, 1900, the curator, Mr. J. E. Duerden, writes on the bad effect the financial depression which has overtaken the West Indies has had on the work the institute was founded to carry on, causing serious lack of funds in the last two or three years. A good deal of interest, however, is maintained in the museum, as is shown by the long list of gifts. With a total grant of £1749, it is obviously impossible to enrich the collections by purchases, and the sum is altogether inadequate to properly maintain this important and very useful institute, which comprises art gallery, science museum, and library.

Liverpool.—The report for 1899 says—

"The work of our museum is much hampered by the structural alterations rendered necessary by the new buildings, but we shall be amply compensated for our present inconveniences by the magnificent accommodation which will be afforded by the new galleries when completed. The area of our museum will then be 64,000 feet. Our largest gallery will contain 20,000 feet (the largest gallery in the British Museum containing only 13,900 feet), and it will be possible to display far better than in any other museum the various groups of the animal kingdom in their phylogenetic relations, and as nearly as possible, therefore, in their natural sequence. The museum will thus be at once comprehensible to the general public, and vastly more instructive than it has hitherto been.

"The committee have encouraged original research by our museum staff, and the Bulletin, published quarterly, has already taken its place among the leading scientific periodicals of the day.

"The Sokotra expedition yielded some 2000 specimens, of which 100 species are new to science, and the whole are new to our collection. The action of the committee in sending out this expedition has been most warmly appreciated in scientific circles."

This latter statement will be cordially supported by all members of the Museums Association, who appreciate most fully the

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excellent work the committee of the Liverpool museum has thus done, and the noble example they have set to other museums.

Dr. Forbes in the report gives a lengthy summary of the operations of the expedition to Sokotra.

There has been a large falling off in the number of visitors, which may probably be, in part, due to the disorganisation caused by the extension of the buildings, which it is hoped, when completed, will enable the staff to make the collections more interesting and more comprehensible to the general public. The attendance of school children under the charge of teachers has been well maintained, 1260 of them having made part of their school attendance in the museum. The usual list is given of what are considered distinguished visitors. A course of twenty-one lectures was delivered in the theatre of the museum by three of the assistants, at which there was an average attendance of rather more than 100 people at each lecture. The acquisitions to the collections are numerous and important.

London: Parke's Museum of the Sanitary Institute.—This institute has for its object the advancement of sanitary science, carried out by means of lectures, examinations, and congresses, the museum itself being designed as a part of this work. The report for the year ending March, 1900, shows that it is in an exceedingly flourishing financial position, and the value of the museum is evidenced by the fact that it is intended to erect, as soon as possible, a new building for its accommodation. Its object is evidently to further the teaching of sanitary science, but no particulars of the museum or the nature of its contents are specified in this report.

Maidstone.—The committee of this museum, anxious to obtain information in regard to existing arrangements for the custody of documents, as well as suggestions for the future, have prepared two schedules dealing with these points, and the curator and librarian suggest the desirability of preparing a catalogue of all manuscript and other documents relating to the king's town. This is an excellent suggestion that might bear good fruit in other towns. In the museum it appears that special attention is wisely given to local natural history, as many as 343 specimens being added to this collection during the year.

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Manchester.— Possibly the museum at Owens College may be subject to liabilities not generally imposed on other public museums, but considering that the public has accesss to it, that it is a direct teaching agency for the whole city, and that the very fact of its connection with the college enables it to do its work all the more thoroughly, it seems rather an anomaly that it should have a fine inflicted that other museums have not to bear. This takes the form of rates which amount to the large sum of £242. It has been decided that libraries and museums are not liable for rates, and if they are charged in Manchester because the museum, which is in every sense public and free, is attached to Owens College, the Corporation might relieve them by a clause in their next bill. Sheffield has gone further than this, and is asking power to relieve the University College of rates, the museum never having had to pay any.

The report for the year ending June, 1900, refers in the first place to the provision made for the "Dresser" collection of birds; and then records, amongst other acquisitions, the gift of the "Schill" collection of butterflies and moths, numbering thousands of specimens. Particulars of publications, labels, and lectures are given.

Newcastle.—The report of this museum is really the report of the Natural History Society of Northumberland, Durham, and Newcastle-upon-Tyne, whose active zeal leaves no excuse, and makes no necessity for the municipal authority to concern itself with the management of the museum, which ranks amongst the best natural history museums in the kingdom, both as regards the nature of its contents and the manner in which they are utilised. To the man of science it affords material of the rarest and most useful kind, while to the general public the attractiveness of its treasures compels admiration, and their orderly display, clear labelling, and efficient description tempt the acquirement of knowledge even by "the man in the street." And this is the work of a private society. That it is appreciated widely is shown by the ready help obtained from outsiders when required, an instance being given in the last report of the ample subscriptions received for the necessary repairs to the building.

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Norwich.—As the President's paper on this interesting museum is published in this volume, it is not necessary to refer at any length to the four annual reports kindly forwarded by the curator. These give the results of the transfer of the museum from its old quarters to the picturesque site it now occupies, and reflect very great honour on the citizens of Norwich for the liberal way in which they provided the means for erecting the present handsome and well-adapted building. Its appreciation is shown in the fact that considerably more than 100,000 people visit it annually. The report for 1899 records the reception of the valuable bequest of pictures made by the late Mr. J. J. Colman, as well as an enviably lengthy list of gifts in all departments of art and science. One addition during the year is especially interesting. It consists of a case containing a group of rooks and their nests. The tree on which the nests were built having been blown down, the bough shown was sawn off with the upper nest still attached to it. The spectator sees here, therefore, the actual work of birds, and not an imitation of it.

Oxford: Pitt-Rivers Museum.—Additional new wall-cases were added to the museum in 1899, making it possible to exhibit further important series of objects. These cases have been made with false backs fitted with doors, so that space behind is available for storing reserve and research material in immediate connection with the exhibited material of like kind, a matter of considerable convenience and importance. Labels, sketches, etc., have been added to several of the exhibited series, and various rearrangements of collections have taken place to make them more readily accessible for observation and study. The list of accessions is a particularly lengthy one, occupying thirty-two pages of the report.

Plymouth.—It is intended to erect in Plymouth a "Diamond Jubilee" museum and art gallery, the accepted design for which forms the frontispiece to the first report on the museum and art gallery for 1899, and a very suitable memorial it will be; but as the funds are not yet forthcoming, a temporary building has been occupied in order to get together suitable collections, and this was opened as a museum in 1898. The use being made of it by

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the public, and the value of the collections in formation, will act as a spur to the realisation of the larger and more complete scheme, which will bring Plymouth into line with the other important towns of the kingdom.

Salford.—The old order steadily continues to give place to the new in this royal museum. As if the work of developing, arranging, and labelling a large museum and art gallery was not sufficient, a nucleus of a branch museum, illustrative of industrial processes, has been started at one of the district libraries; all the libraries, it appears, being under the management of the museum curator, a multiplication of duties that few towns now attempt to place on one individual, who, be he never so competent, has a limit to his natural capacities and physical energies. The offices of librarian and curator are too distinct and dissimilar to appeal satisfactorily to one order of genius. The removal of the industrial objects from the museum has permitted a much more satisfactory display of the art treasures, to which useful additions have been made both by gift and purchase. The ethnographical collections of Salford are of tolerably old date, and consequently contain many objects of great value, because now unattainable; and it is satisfactory to know that the ancient cases in which this collection has hitherto been placed—not displayed, for they were inadequate to that function—are to be supplanted by modern show-cases that will enable the collection to be seen and studied with some degree of comfort and advantage. Mr. Mullen's labours will be rewarded with widespread appreciation, and he certainly realises the necessity for making the useful contents of this museum properly available and intelligible to the public.

Sheffield: Ruskin Museum.—A modest little pamphlet of four pages suffices to contain the report of this museum for the year ending 25th March, 1900. At first sight it looks as if the interest in the museum was waning very fast, for the statistics show a decrease of nearly 4000 in the number of visitors. The fact, however, that 34,588 people visited this museum in the twelve months shows a very large appreciation of its contents, for, after all, it is not a museum that appeals strongly to the general public, nor is its position in Sheffield such as to offer any special inducement to

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visit it. That it is being used in a way that its founder would most approve is shown by the increase of 109 visitors to the library and print department, which altogether numbered 478 in the year, and there were, in addition, 26 applications for the purposes of study in pencil and watercolour. Though this may not appear to be a strikingly large number, yet, when the nature of the museum is taken into consideration, it is by no means unsatisfactory. The list of additions is small and unimportant, which is, perhaps, not altogether to be regretted, for now that Ruskin's great influence is for ever removed it would be risky and, ultimately, destructive to attempt to build up his museum in accordance with the ideas of less gifted individuals. It should remain a well-cared-for memorial of the great master, touched as little as possible by other hands.

South African Museum, Capetown.—During the year an additional room has been added to the geological department, specially devoted to South African geology, and a new wing has been built for the reception of the works of art previously stored in the public library. The visitors to the museum have increased from 22,666 in 1893 to 88,571 in 1899, each year showing an advance. The number of specimens added was 7889, of which 538 were species new to the museum. As an encouragement for work done, as well as an incentive to further exertions, the trustees have appointed certain gentlemen, who had contributed largely to the museum collections, "correspondents of the museum," and they will in future receive the publications. Considering the utterly insufficient sum available for the expenses of the museum —only amounting to £2500—it is almost amazing to read this record of work and progress. Evidently the staff is fired with energetic zeal, and there are many helpful friends outside the museum.

Sunderland.—In their report for 1899 the committee say that "valuable gifts to the museum have come from former Sunderland residents, who in this way show continued interest in the successful working of the institution"—a very proper and practical example of grateful memories. Of these gifts the curator specially mentions British marine shells, which so far augment the collection as to

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approach completion. The other additions are numerous and useful.

Worcester.—The museum continues to make steady though somewhat slow progress, owing chiefly to lack of funds. During the past year the collections have been enriched by numerous donations, the most noteworthy being a collection of upwards of 1000 specimens of minerals, most of which have now been mounted and displayed; also a number of the "Challenger" duplicates which have been presented by the trustees of the British museum. The committee has also acquired by purchase from the Marine laboratory at Plymouth a number of marine invertebrates as types for the index collection.

The local geological collection has been entirely reclassified and special descriptive labels introduced. Expert assistance has been obtained for two sections, viz., the recent corals and the series of local rocks. It is hoped to go through the whole of the collections by doing one or two sections each year, and thus bring the museum up to date as far as possible.

The museum is largely used by students from the science and art schools, as well as by the more advanced children from the elementary schools, to both of which the curator periodically delivers short addresses on the contents of the cases.

The museum galleries are open daily (Sundays excepted) from ten a.m. till sunset, and the average number of visitors per month is about 8000.

York.—Appended to the report for 1899 are two useful parts of lists of collections in the museum. The first is part i. of the British bird collections, and the other is part vi. of catalogue of British plants in the museum herbarium. Presumably these catalogues, when completed, will be published separately, as their value extends far beyond the visitors to the museum. The report generally shows that the Yorkshire Philosophical Society continues to maintain its museum at the high level it has always been a pleasing duty to record in these columns.

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MUSEUM PUBLICATIONS.

The editor regrets that he is unable to insert notices of the large number of interesting publications which have been kindly sent to him from various museums. To do so would probably delay the publication of this volume for some months, and he must content himself with simply giving a list of them here, in the earnest hope that the steps being taken for the inauguration of a museum journal may prove successful, so that some of these publications may ultimately be treated with that consideration which they merit, and that museum literature generally may be more adequately and usefully dealt with.

Cardiff.—An Illustrative Selection of Old Worcester Porcelain on Loan to the Corporation Museum and Art Gallery of Cardiff, 1899; price 3d. "The object of this selection is education, not display."

—— Report and Plans for proposed new Museum and Art Gallery.

—— A Museum Index-Collection.

Carnegie Museum, Pittsburgh.—Prize Essay Contest, 1899. Money prizes are awarded to schools of various grades.

> "Each contestant is required to make a thorough study and inspection of the museum, and is urged to bring parents and friends to aid in gaining an intelligent understanding of the exhibits. The pupils should then write a composition upon the subject: 'What I learned from five objects in the Carnegie Museum.'"

This is a seductive method of inducing children to rightly understand the value of a museum.

Colombo.—Supplements to the Catalogue of the Colombo Museum Library.

Dublin: Science and Art Museum.—General Guides to the Art Collections, parts i., iv., viii., xv.; price 1d. each.

—— List of some Books in the National Library of Ireland, or in the Library of the Museum, which may be useful to visitors to the museum; price 1d.

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Dublin: Science and Art Museum.—A List of Irish Birds, showing the Species contained in the Science and Art Museum, Dublin, by Alex. G. More, F.L.S.; price 4d.

—— Science and Art Museum: Short Guide to the Collections; price ½d.

—— Guide to the Collection of Rocks and Fossils belonging to the Geological Survey of Ireland, arranged in the Museum of Science and Art, by A. M'Henry and W. W. Watts, M.A.; price 9d.

Jamaica.—Journal of the Institute of Jamaica, vol. ii. (No. 6), March, 1899; price 2s.

—— Jamaica Actinaria, part ii., by J. E. Duerden (published in the Scientific Transactions of the Royal Dublin Society, vol. vii., series 2).

London: Museum of Practical Geology.—Handbook to the Collection of British Pottery and Porcelain; 1s.

—— Handbook to the Museum of Practical Geology; 6d.

Maidstone: Museum and Art Gallery.—Brief illustrated description for the use of visitors, 1899.

Manchester.—Notes from the Manchester Museum (No. 6).—Some Jurassic Plants in the Manchester Museum, 1900.

—— Museum Labels: the Principal Divisions of the Coleoptera; 3d.

Newcastle-upon-Tyne.—Catalogue of the Fishes of the Rivers and Coast of Northumberland and the adjacent Sea, by Richard Howse; 4d.

—— Guide to the Collections of Local Fossils in the Museum of the Natural History Society, Barras Bridge; 6d.

—— Guide to the Museum of the Natural History Society, Barras Bridge, by Richard Howse, M.A.; 3d.

—— Catalogue of Fossil Plants from the Hutton Collection, by Richard Howse; 5s.

—— Index-Catalogue of the Birds in the Hancock Collection, by Richard Howse, M.A.; 6d.

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Norwich.—Official Guide to the Norwich Castle Museum; 1s.

—— Catalogue of the Pictures, Drawings, Etchings, and Bronzes in the Picture Gallery of the Norwich Castle Museum, 2nd edition; 1d.

—— Descriptive Key to the View from the Battlements of the Castle.

Parke's Museum of the Sanitary Institute.—Descriptive Catalogue; 6d.

Perth.—Transactions and Proceedings of the Perthshire Society of Natural Science, vol. iii., part 2, 1899-1900.

Perth, Australia.—Guide to the Contents of the Western Australian Museum and Art Gallery, with a List of the Western Australian Marsupials and Birds, 1900; 1s.

Salford: Royal Museum, Peel Park.—Official Handbook to the Fine Arts Section, 3rd edition, 1900; 2d.

—— Popular Guide to the Collections, by the Curator; ½d.

Sheffield: Ruskin Museum.—A Popular Illustrated Handbook to the Collection of Minerals and Objects of Art; 3d.

South African Museum, Capetown.—Annals: vol. ii., part 1, containing A Collection of Slugs from South Africa, with Descriptions of some New Species, by Walter E. Collinge, F.Z.S.; part 2, containing The Meteoric Irons from Griqualand East, by Prof. E. Cohen, and The Meteoric Iron from Bethany, Great Namaqualand, by Prof. E. Cohen; part 3, containing The Moths of South Africa (part 1), by Sir G. F. Hampson, Bart., B.A.

Meyer, Dr. A. B.—Über Museen des Ostens der Vereinigten Staaten von Nord Amerika; Berlin, 1900.

Morgan, J.—Descriptive Guide to the Collection of Corals at the South London Art Gallery, Peckham Rd., London, S.E.; 1d.

Smith, Harlan I.—Archæology of Lytton, British Columbia, 1900.

Ward, John.—Billingsley and Pardoe: Two Derby "Men of Mark," and their connection with South Wales; 3d.

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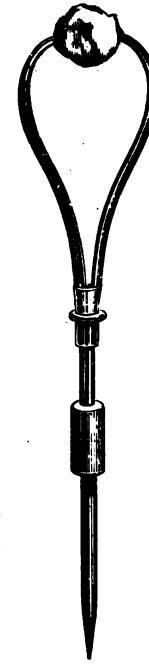
Specially adapted for holding descriptive label on card or metal tray. The top clip, holding ticket, can easily be bent to any required angle, whilst the other clips the side of the tray. Invaluable for Geological Section. Supplied in the following sizes:—¾ in., 4/- per gross; 1¼ in., 6/- per gross; 2 in., 6/6 per gross.

Also with base to stand—2½ in., 30/- per gross; 3 in., 33/- per gross; 3½ in., 36/- per gross; 4 in., 39/- per gross.



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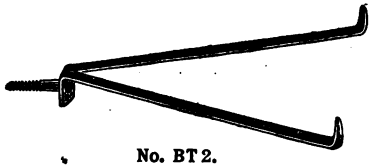
Height, -	1	1½	2	2½	3	4	5 inches.
With Spike as shown,	4/-	6/-	8/-	10/-	12/-	15/-	18/- per gross.



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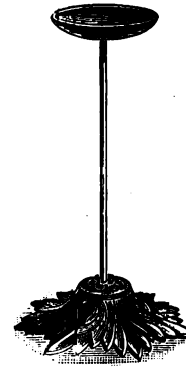
Useful Fitting for screwing into display boards, show cases, &c. It projects 3 inches, and supports cases, small trays, boxes, mounted birds, &c., &c. 4/- per dozen.



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Bronze plated, assorted, 3 in., 4 in., and 5 in. high. 6/6 per dozen; 72/- per gross.

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With sliding adjuster and clip for descriptive ticket, 4/- per dozen; 42/- per gross. Sizes, 1¾ in., 2½ in., and 3½ in. high. Or fitted with base to stand, 8/- per dozen.

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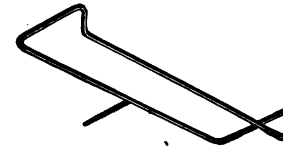
2/3 per doz.; 24/- per gross. The clip is steel, and the wires brass. Can be bent as required. Suitable for mounted specimens, &c.



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Bronzed Wire Support, with screw for fixing to trays, backs of cases, &c., for carrying small specimens or labels. In two sizes—1 in. and 1½ in. wide. 1/6 per dozen; 15/- per gross.

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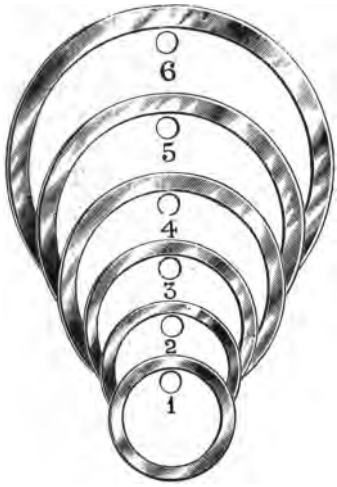
METAL RIM TABS,

With white card centres. For marking specimens where label cannot be affixed.
SIX SIZES.
3/6 4/3 5/- 7/9 9/- 12/- per 1000.



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Lined white paper inside and black outside. As used at the Geological Museum, London.

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1 size,	2 in. by	1½ in. by	⅛ in.,	- 18/- per gross.
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4 ,,	3½ in. ,,	2½ in. ,,	1⅜ in.,	- 27/- ,,
5 ,,	4 in. ,,	3 in. ,,	1⅝ in.,	- 31/- ,,
6 ,,	4½ in. ,,	3⅜ in. ,,	1¾ in.,	- 36/- ,,
The above 6 sizes, assorted equally,				27/- ,,

Outside measurements are quoted. Any other size, shape, or quality made to order.

No. 15.—Neat Cardboard Tray for Specimens.
Same length, width, and finish as boxes No. 14, but all are ½ in. high.

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	4/-	5/-	6/-	7/6	9/-	10/6	per gross.

Larger sizes to order.

Cardboard for Mounting or Ticket-writing.

No.	Size.		
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270A.	—Ivory Card, 24 by 19 in., thick,	4/6	,,
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Half the above sizes at half the prices.

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Price 2/6 per gross.
For suspending labels, &c., from rods or wires.

Wire R Hook.
Price 2/- per gross.
A most useful hook for suspending cards, carded specimens, or descriptive labels from rods or wires.

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For putting into wood shelves.
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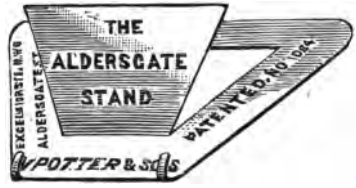

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For supporting descriptive cards at any angle.
Small size, 2 in. by 1⅜ in., - 10/- per gross.
Large size, 3¼ in. ,, 2½ in., - 24/- ,,

Mannikin Hook (Patent). 1/- per gross.

This is the smallest Ticket Hook made. It is specially adapted for holding small tickets on any soft material, and makes the smallest possible pin-hole.

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Round, Silver colour, shouldered, and dust tight.

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No. 2 size.—2 in. by	11/16 in.,	- 13/6	,,
No. 3 size.—2¼ in. by	3/4 in.,	- 16/-	,,
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No. 5 size.—2⅝ in. by 1	in.,	- 24/6	,,
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ALL METAL.

No. 7 size.—1½ in. by	9/16 in.,	- 7/6	per gross
No. 8 size.—2 in. by	11/16 in.,	- 9/6	,,
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6	8	10	12 inch.
10d.	1/3	1/6	1/9 each.
15	18	21	24 inch.
2/6	3/6	4/6	5/6 each.

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Can be obtained at all prices. In comparing lists, purchasers are earnestly solicited to *consider quality* as well as *rate*. Common cases answer very well for many purposes, but for first-class air-tight work of highest quality a high rate is compulsory. We quote for various qualities, and in each instance we *guarantee* to give *full value*. Packing cases are charged, but allowed *in full* if returned in good condition, carriage paid, within seven days.

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First Quality—Plate Glass,	Ebony Rails,	Air-tight, Mirror-lined Drop Doors,	35/- per foot
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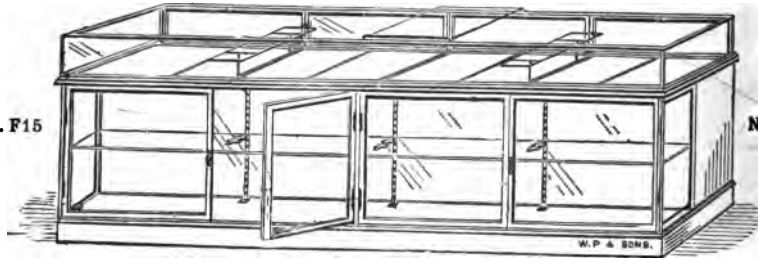
Special Quality ,,	,,	Dust-tight,	22/6 ,,

Including a full set of Velvet-covered Moveable Trays.



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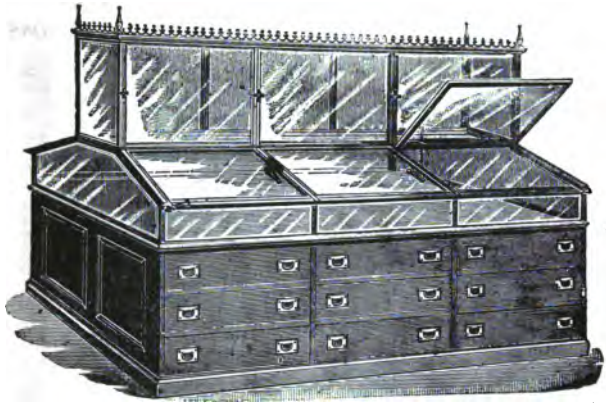
No. F15

No. F15.—COMBINATION SHOW CASE.

Air-tight Top Case, 24 in. wide, 9 in. deep, Mahogany, ebonised and polished, glazed Plate Glass, Mirror-lined Doors; inside fitted with Velvet-lined Trays. The under Show Case Mahogany, Air-tight, fitted with Opening Sashes, glazed Plate Glass; this is about 12-in. deep outside; the back is Mirror-lined, and fitted with Tapped Bars, Brackets, and one polished-edge Plate-Glass Shelf, the full length and width; the back is fitted with one Wood Shelf. Height, including Case, is 3 ft. 3 in.

5 ft. long,	3 ft. 3 in. high,	24 in. wide,	£17	15	0	7 ft. long,	3 ft. 3 in. high,	24 in. wide,	£24 0 0
6 ft. ,,	3 ft. 3 in. ,,	24 in. ,,	20	0	0	8 ft. ,,	3 ft. 3 in. ,,	24 in. ,,	27 10 0

Drawers for back can be added, if desired, at an extra charge. Packing 30/- to 40/- extra. For economisation of space and attractiveness this combination is specially recommended.



No. F 103.—Handsome Mahogany Polished or Mahogany Ebonised Plate-Glass Case.

Admirably adapted for showing museum specimens. The upper portion of Show Case opens on both sides with swinging sashes, the lower is arranged on both sides with lift-up sloping desk sashes furnished with brass quadrants for keeping open, when required. The case is supported on a mahogany table with double panelled and moulded ends, fitted with a full set of mahogany fronted dovetailed drawers, forming altogether a most excellent method of protecting specimens from damage. Instead of drawers, the table portion could be made an additional Show Case, if desired, or to stand on legs.

DIMENSIONS.

Total height, 6 ft. 3 in. (excluding ornamental iron cresting and finials).

Table height, 2 ft. 9 in.; depth, 4 ft. 6 in.

Total height of Show Case (excluding cresting), 3 ft. 6 in.

Height of upper part of Show Case, 2 ft. 1½ in.

Depth of upper part of Show Case, 14 in.

The lower portion of Show Case measures at its highest 15 in., and at its lowest 9 in.

Bottom of Case is covered with Claret or Blue coloured Cloth. The under part of table is fitted with Drawers, three in height and length, according to dimensions of Case. All Sashes are made on the "air-tight" principle, and glazed Plate Glass.

7 ft. by 4 ft. 6 in. by 6 ft. 3 in., 18 Drawers, **£66 10/-**

9 ft. by 4 ft. 6 in. by 6 ft., 24 Drawers, **£78 10/-**

12 ft. by 4 ft. 6 in. by 6 ft., 30 Drawers, **£95.**

If delivered outside London, an extra charge is made for packing, according to size, varying from **£3** upwards.

No. J 23.

First Quality Centre Case, air-tight sashes, ebonised and polished mahogany, clear glass all round. Inside fitted with 4 tapped bars, and 2 polished edge plate-glass shelves the full size of case.

6 ft. high by 30 in. by 18 in.,	-	-	£19	0	0
6	,,	36	,,	24	,,	-	-	24	0	0
7	,,	42	,,	24	,,	-	-	29	5	0
7	,,	54	,,	30	,,	-	-	33	15	0
7	,,	72	,,	30	,,	-	-	38	17	6

No. 518.—Mahogany Plate-Glass Case.

Clear plate glass all round and top, carved pediment. Inside fitted with one full-size plate-glass shelf, 4 tapped bars and brackets. Splendid case for centre of room.

Height, ins.	Width, ins.	Depth, ins.	A Quality, air-tight.			B Quality, without pediment or inside fittings.		
36	36	24	£15	5	0	£9	17	6
36	48	24	18	10	0	12	15	0
36	54	30	21	15	0	15	10	0
48	60	30	25	0	0	18	10	0

Table or Stand for above, 37/6, 57/6, & 72/6 extra.

Glass Show Cases made for all purposes—any size or shape. Estimates and drawings supplied on application.

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